امتحانات رقم (1)

الترم الثانى

Some Schools Examinations

2025
on Geometry

1 Cairo Governorate

El-Nozha Ed. Zone
Math. Inspection

Answer the following questions :

1 Choose the correct answer :

1 If a square of diagonal length 10 cm. , then its area = ... cm^2.

(a) 100 (b) 40 (c) 25 (d) 50

2 All ..... are similar.

(a) triangles (b) squares (c) rhombuses (d) rectangles

3 If the area of the parallelogram ABCD = 20 cm^2. , then the area of Δ ABC = ... cm^2.

(a) 40 (b) 20 (c) 10 (d) 15

4 In Δ ABC if $(AC)^2 < (AB)^2 + (BC)^2$, then $\angle$ B is ..... angle.

(a) a right (b) an acute (c) an obtuse (d) a straight

5 The length of the projection of $\overline{AB}$ on a straight line ..... the length of $\overline{AB}$

(a) $\geq$ (b) $>$ (c) $=$ (d) $\leq$

2 Complete the following :

1 If Δ ABC $\sim$ Δ XYZ , m ($\angle$ A) = 50° , m ($\angle$ Y) = 30° , then m ($\angle$ Z) = ... °

2 In Δ ABC if $(AB)^2 = (AC)^2 - (BC)^2$, then the triangle is right-angled at .....

3 The sum of the measures of the interior angles of a quadrilateral = ...°

4 The measure of the exterior angle of an equilateral triangle = ... °

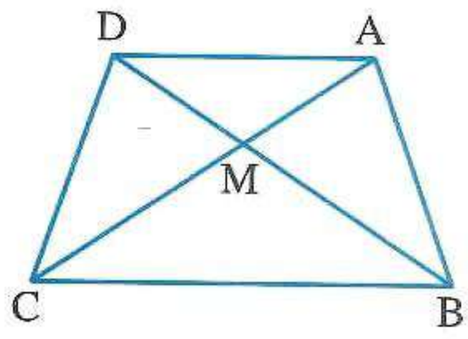
3 [a] If the height of a trapezium is 6 cm. and its area is 40 cm^2. , then find the length of its middle base.

[b] In the opposite figure :

$\overline{AC} \cap \overline{BD} = \{M\}$

, the area of Δ ABM = the area of Δ DCM

Prove that : $\overline{AD} // \overline{BC}$



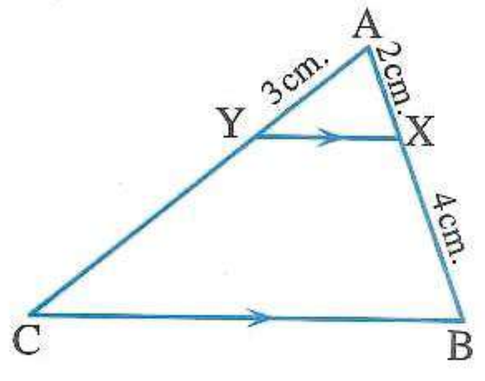
4 [a] **In the opposite figure :**

$\overline{XY} // \overline{BC}$, AY = 3 cm. ,

AX = 2 cm. , XB = 4 cm.

1 **Prove that :** Δ ABC $\sim$ Δ AXY

2 **Find :** the length of $\overline{YC}$

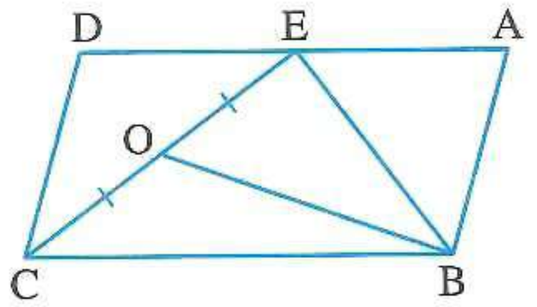


[b] In the opposite figure :

ABCD is a parallelogram

its area = 40 cm^2 , EO = OC

Find : the area of Δ BEO (with proof)



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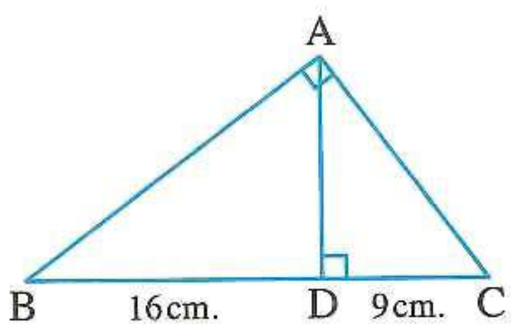
5 [a] In the opposite figure :

ABC is a triangle in which m (∠ A) = 90°

, $\overline{AD} \perp \overline{BC}$, BD = 16 cm. , CD = 9 cm.

Find : the length of $\overline{AB}$, $\overline{AD}$



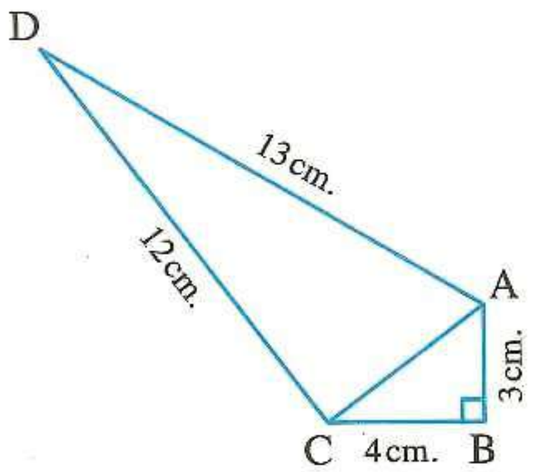
[b] In the opposite figure :

ABC is a triangle in which : m (∠ B) = 90°

, AB = 3 cm. , BC = 4 cm.

, AD = 13 cm. , CD = 12 cm.

Prove that : m (∠ ACD) = 90°



Answer the following questions :

1 Choose the correct answer :

1 ABC is right-angled triangle at B , AB = 15 cm. , BC = 20 cm. , then AC = ... cm.

(a) 15 (b) 20 (c) 25 (d) 30

2 The area of the parallelogram ABCD = ... cm^2 , if the area of Δ ABC = 25 cm^2

(a) 10 (b) 20 (c) 40 (d) 50

3 If the ratio between the lengths of two corresponding sides in two similar triangles > 1 , then this ratio represents .....

(a) enlargment (b) congruence (c) reduction (d) minimization

4 The projection of a perpendicular line segment on a given straight line is .....

(a) a ray. (b) a straight line. (c) a line segment. (d) a point.

5 In the triangle ABC , if $(AC)^2 = (AB)^2 + (BC)^2$, then ∠ B is .....

(a) acute. (b) obtuse. (c) right. (d) straight.

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2 Complete each of the following :

1 The number of axes of symmetry for the scalene triangle is .....

2 The length of the diagonal of a square is 6 cm. , then its area = ... cm^2.

3 The two triangles are similar if the corresponding angles are .....

4 If ABC is a triangle , m ($\angle$ B) = 50° , m ($\angle$ C) = 60° , then m ($\angle$ A) = ... °

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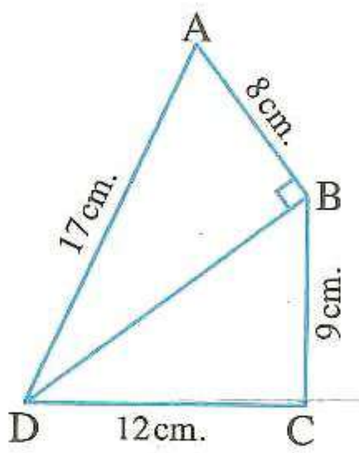
3 [a] State the type of Δ ABC according to its angles , if AB = 9 cm. , BC = 12 cm. , AC = 15 cm.

[b] In the opposite figure :

ABCD is a quadrilateral in which :

AB = 8 cm. , BC = 9 cm. , CD = 12 cm.

, AD = 17 cm. and $\overline{DB} \perp \overline{AB}$



1 **Find :** the length of $\overline{BD}$

2 **Prove that :** m ($\angle$ C) = 90°

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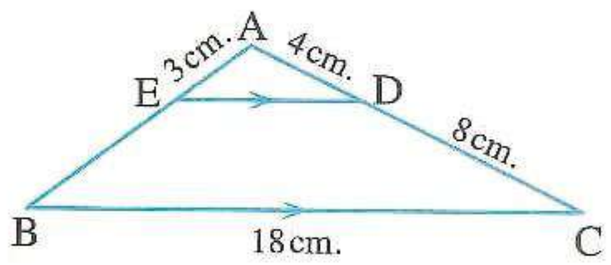
4 [a] Which is greater in area , a trapezium in which the lengths of its two parallel bases are 14 cm. and 6 cm. and its height = 3 cm. or rhombus its two diagonals lengths are 6 cm. and 8 cm. ?

[b] In the opposite figure :

$\overline{ED} // \overline{BC}$, AD = 4 cm. , DC = 8 cm.

, EA = 3 cm. , BC = 18 cm.



1 **Prove that :** Δ AED ~ Δ ABC

2 **Find :** the length of $\overline{ED}$

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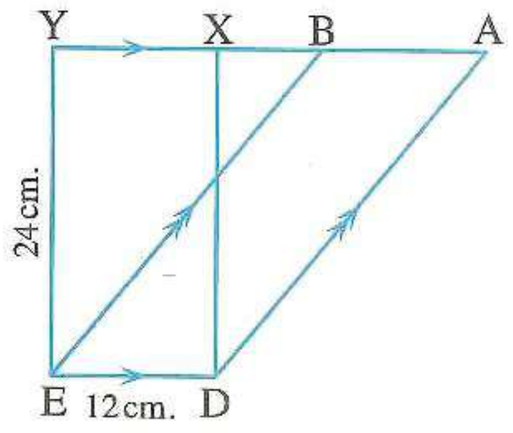
5 [a] **In the opposite figure :**

$\overleftrightarrow{AB} // \overleftrightarrow{DE}$, $X \in \overrightarrow{AB}$, $Y \in \overrightarrow{AB}$

, XDEY is a rectangle , $\overline{AD} // \overline{BE}$

, DE = 12 cm. , YE = 24 cm.

Find : the area of the figure ABED

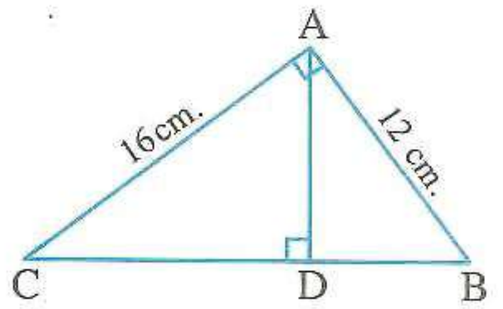


[b] In the opposite figure :

Δ ABC is right-angled at A , $\overline{AD} \perp \overline{BC}$

, AB = 12 cm. , AC = 16 cm.

Find : the length of each of $\overline{BC}$ and $\overline{AD}$



3 Giza Governorate

El Dokki Educational Directorate
Talae Al-Mustakbal Language School

Answer the following questions :

1 Choose the correct answer :

1 If the area of a parallelogram is 42 cm^2 and its height is 7 cm. , then the length of the corresponding base to this height is ..... cm.

(a) 7 (b) 5 (c) 40 (d) 6

2 The number of axes of symmetry of the rectangle equals .....

(a) zero. (b) 1 (c) 2 (d) 4

3 If the area of a trapezium is 32 cm^2 , its height is 4 cm. , then the length of its middle base equals ..... cm.

(a) 4 (b) 8 (c) 14 (d) 16

4 If ABC is a triangle , $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

5 If ABCD is a parallelogram , $E \in \overline{BC}$, then the area of $\square$ ABCD = ...
the area of Δ EAD

(a) same (b) half (c) twice (d) third

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2 Complete each of the following :

1 In two similar polygons , their corresponding side lengths are .....

2 The rectangle is a parallelogram in which one of its angles is .....

3 The median of a triangle divides its surface into two triangular surfaces .....

4 If A $\in$ the straight line L , then its projection on the straight line L is .....

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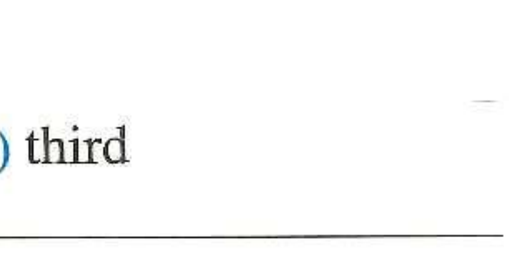
3 [a] In the opposite figure :

ABC is a right-angled triangle at A

, $D \in \overline{CB}$, $\overline{AD} \perp \overline{CB}$

, CD = 16 cm. , DB = 9 cm.

Find : the length of each of $\overline{AC}$, $\overline{AB}$, $\overline{AD}$



[b] ABC is a triangle in which : AB = 7 cm. , BC = 10 cm. , AC = 8 cm.

Determine the type of Δ ABC according to its angles (write steps)

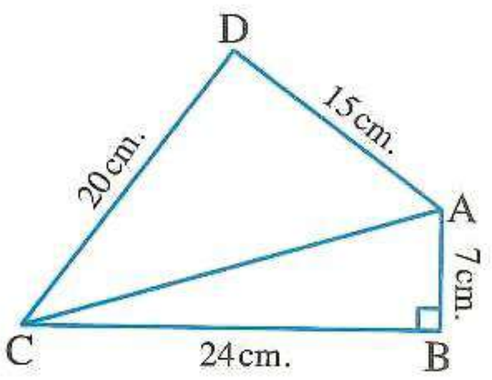
4 **[a] In the opposite figure :**

$m(\angle B) = 90°$, $AB = 7$ cm.

, $BC = 24$ cm. , $AD = 15$ cm.

and $CD = 20$ cm.

Prove that : $m(\angle D) = 90°$

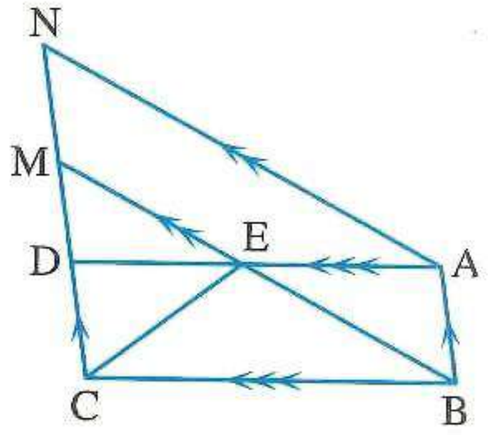


[b] In the opposite figure :

ABCD and ABMN are two parallelograms

Prove that :

The area of $\Delta EBC = \frac{1}{2}$ the area of $\square ABMN$



5 **[a] In the opposite figure :**

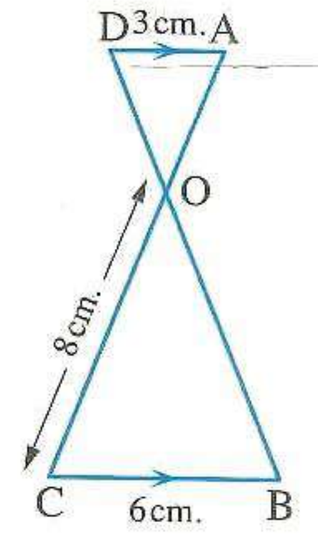
$\overline{DA} \parallel \overline{CB}$

, $AD = 3$ cm. , $BC = 6$ cm.

and $OC = 8$ cm.

1 **Prove that :** $\Delta AOD \sim \Delta COB$

2 **Find :** the length of $\overline{AO}$



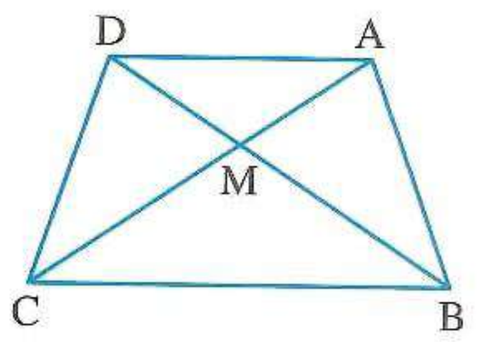
[b] In the opposite figure :

ABCD is a quadrilateral

, its diagonals intersect at M

and the area of ΔABM = the area of ΔDCM

Prove that : $\overline{AD} \parallel \overline{BC}$



4 Giza Governorate

South Giza Zone
Math Inspection

Answer the following questions :

1 **Choose the correct answer :**

1 The square whose diagonal length is 10 cm. , its area = ...

(a) 50 cm^2 (b) 40 cm^2 (c) 20 cm^2 (d) 100 cm^2

2 In ΔABC , if $(AB)^2 = (BC)^2 + (CA)^2$, then $\angle C$ is ..... angle.

(a) an acute (b) an obtuse (c) a right (d) otherwise

3 If $\Delta ABC \sim \Delta XYZ$, then $m(\angle A) = m(\angle$ ..... $)$

(a) Y (b) X (c) Z (d) otherwise

4 ABCD is a rectangle , AB = 6 cm. , BC = 8 cm. , then AC = ... cm.

(a) 100 (b) 48 (c) 28 (d) 10

5 If $\Delta ABC \equiv \Delta XYZ$, then AC – XZ = ...

(a) 0 (b) AC (c) 2 XZ (d) otherwise.

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2 Complete the following:

1 If the base length of a triangle is 6 cm. and its corresponding height = 4 cm. , then its area = ... cm^2.

2 If the area of a trapezium = 48 cm^2 and its height = 6 cm. , then the length of its middle base = ... cm.

3 ABCD is a parallelogram in which : AB = 10 cm. , BC = 7 cm. and its perimeter = ... cm.

4 The lengths of the sides of a triangle are 5 cm. , 7 cm. and 10 cm. , then the type of this triangle is ..... according to its sides.

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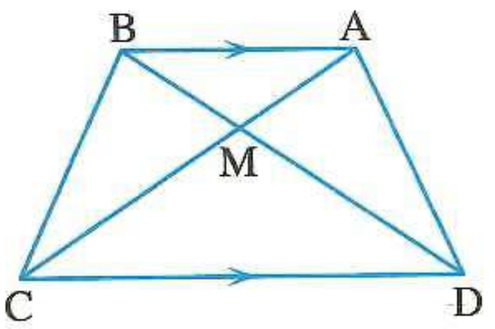
3 [a] Find the diagonal length of the square if its area equals 18 cm^2.

[b] In the opposite figure :

$\overline{BA} \parallel \overline{CD}$

Prove that :

the area of ΔMAD = the area of ΔBMC



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4 [a] If ABCD is a rhombus in which its two diagonals lengths are 16 cm. and 12 cm. find its area

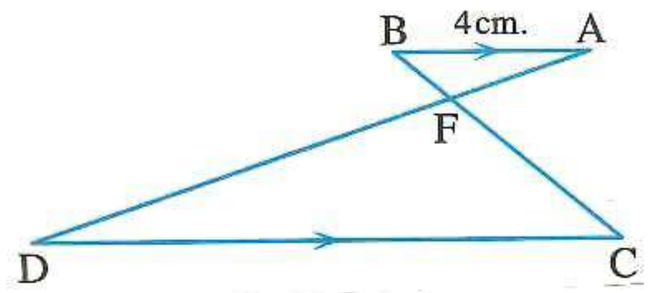
[b] In the opposite figure :

$\overline{AB} \parallel \overline{CD}$, $\frac{FB}{CF} = \frac{2}{3}$

, AB = 4 cm.

1 **Prove that :** $\Delta ABF \sim \Delta DCF$

2 **Find :** the length of $\overline{CD}$



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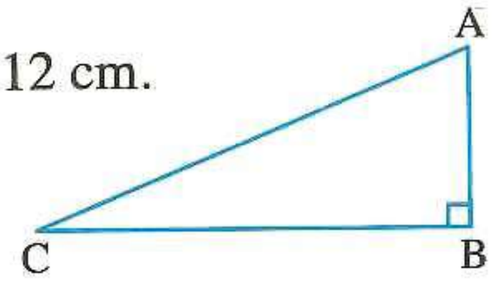
5 [a] In the opposite figure :

ABC is a triangle in which : m ($\angle$ B) = 90° , AB = 5 cm. , BC = 12 cm.

1 **Find :** the length of $\overline{AC}$

2 **Find :** the area of the triangle ABC

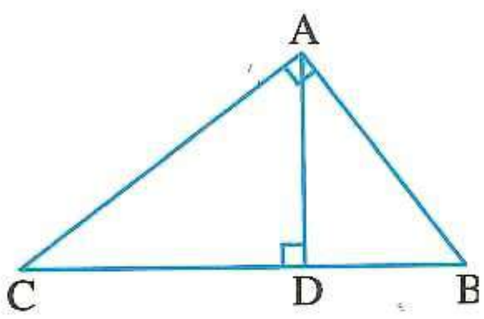


[b] In the opposite figure :

m ($\angle$ BAC) = 90° , $\overline{AD} \perp \overline{BC}$

, CD = 16 cm. , DB = 9 cm.

Find : the length of $\overline{AD}$ and $\overline{AC}$



5 Alexandria Governorate

El Montaza 2nd Education. Zone
Maths Supervision

Answer the following questions :

1 Choose the correct answer :

1 If ABCD is a parallelogram in which : AB = 6 cm. , BC = 5 cm. and its smaller height = 4 cm. , then its area is ..... cm^2.

(a) 15 (b) 20 (c) 24 (d) 30

2 If the area of a rhombus is 48 cm^2. , the length of one of its diagonals = 12 cm. , then the length of the other diagonal = ... cm.

(a) 4 (b) 8 (c) 10 (d) 16

3 If the length of the diagonal of a square is 12 cm. , then its area = ... cm^2.

(a) 144 (b) 96 (c) 81 (d) 72

4 The projection of a point on a given straight line is .....

(a) a point. (b) a line segment. (c) a ray. (d) a straight line.

5 The number of axes of symmetry of an isosceles triangle is .....

(a) zero (b) 1 (c) 2 (d) 3

2 Complete the following :

1 The two triangles are similar if the corresponding sides lengths are .....

2 In Δ ABC , if $(AC)^2 + (CB)^2 = (AB)^2$, then m ($\angle$ .....) = 90°

3 The sum of the measures of two supplementary angles = ... °

4 If ABCD is a square , then the projection of $\overline{AD}$ on $\overleftrightarrow{BC}$ is ..... .

3 [a] In the opposite figure :

$\overline{AD} // \overline{BC}$

Prove that :

The area of Δ ABM = the area of Δ DCM

[b] A trapezium whose lengths of two parallel bases are 24 cm. , 12 cm: and its height is 15 cm.

Find :

1 The length of its middle base.

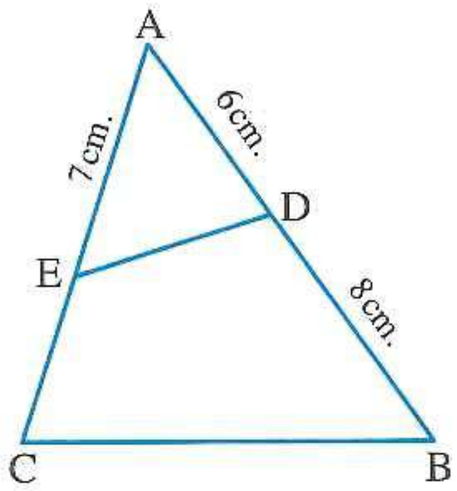
2 The area of the trapezium.

4 **[a] In the opposite figure :**

$\Delta ABC \sim \Delta AED$, AE = 7 cm. , AD = 6 cm. , DB = 8 cm.

Find :

1 The length of $\overline{EC}$ 2 $\frac{DE}{BC}$



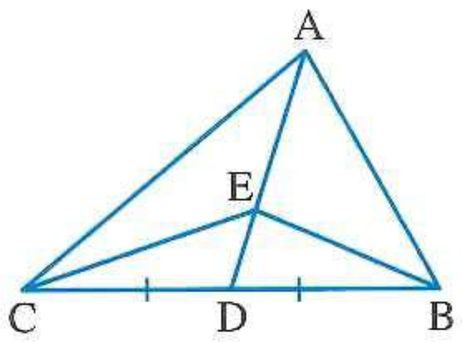
[b] Determine the type of ΔABC according to its angles if AB = 6 cm. BC = 8 cm. AC = 9 cm.

5 **[a] In the opposite figure :**

ABC is a triangle , D is the midpoint of $\overline{BC}$, $E \in \overline{AD}$

Prove that :

The area of ΔABE = the area of ΔACE

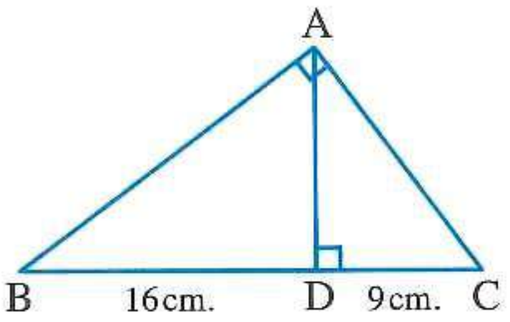


[b] In the opposite figure :

ABC is a triangle , m ($\angle A$) = 90°

, $\overline{AD} \perp \overline{BC}$, BD = 16 cm. , DC = 9 cm.

Find : the length of $\overline{AB}$, $\overline{AC}$, $\overline{AD}$



Answer the following questions :

1 **Choose the correct answer from those given :**

1 ΔABC is obtuse-angled at A , AB = 4 cm. , BC = 7 cm. , then AC may be equals .....

(a) 5 (b) 6 (c) 7 (d) 8

2 The median of a triangle divides its surface into two triangles .....

(a) congruent. (b) equal in area. (c) similar. (d) otherwise.

3 If the lengths of two adjacent sides of a parallelogram are 6 cm. , 9 cm. and its smaller height is 4 cm. , then its greater height is ..... cm.

(a) 6 (b) 12 (c) 15 (d) 24

4 If the ratio between the lengths of two corresponding sides in two similar polygons is ..... , then the two polygons are congruent.

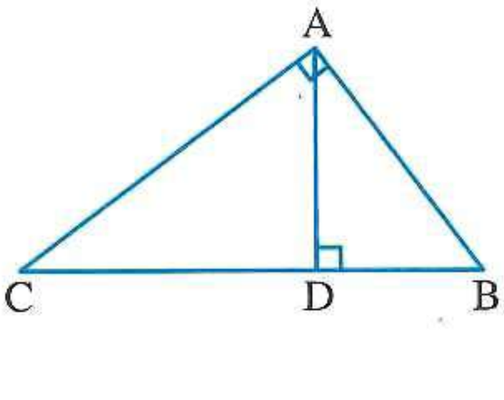
(a) 0.5 (b) 1 (c) $\frac{3}{2}$ (d) 2

5 **In the opposite figure :**

The projection of $\overline{AB}$ on $\overleftrightarrow{BC}$ is .....

(a) $\overline{BC}$ (b) $\overline{BD}$

(c) $\overline{DC}$ (d) $\overline{AD}$



2 Complete the following :

1 If a square its area is 32 cm^2 , then the length of its diagonal is ..... cm.

2 Two similar polygons to a third one are .....

3 Two triangles are similar if their corresponding side lengths are .....

4 The measure of the exterior angle of the equilateral triangle is ..... °

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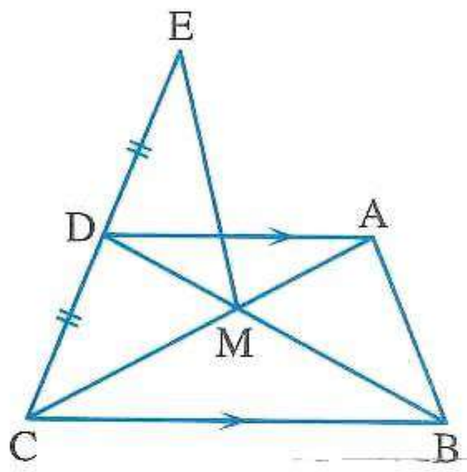
3 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, $E \in \overrightarrow{CD}$

, D is the midpoint of $\overline{CE}$, $\overline{AC} \cap \overline{BD} = \{M\}$

Prove that :

The area of Δ AMB = the area of Δ DME



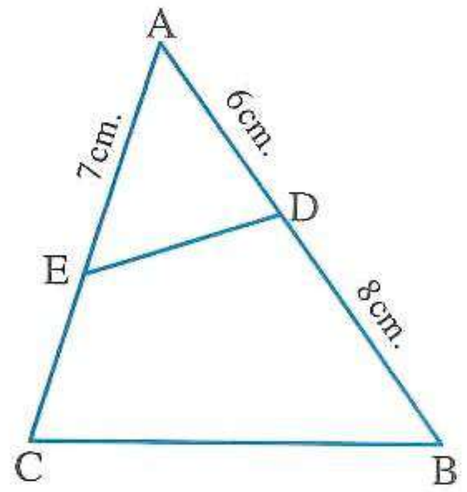
[b] In the opposite figure :

Δ ADE ~ Δ ACB

, AD = 6 cm.

, AE = 7 cm. , DB = 8 cm.

Calculate : the length of $\overline{EC}$



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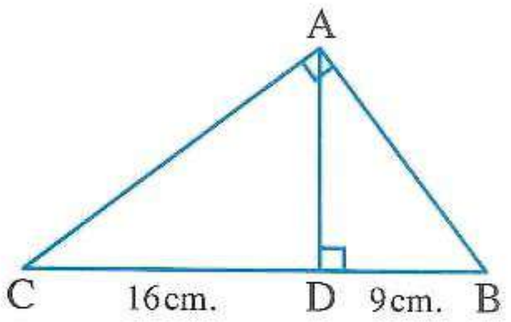
4 [a] In the opposite figure :

m (∠ BAC) = 90°

, $\overline{AD} \perp \overline{BC}$, BD = 9 cm. , DC = 16 cm.

Find : the length of $\overline{AB}$, $\overline{AD}$



[b] A rhombus its perimeter is 52 cm. and the length of one of its diagonals is 10 cm.

Find its area.

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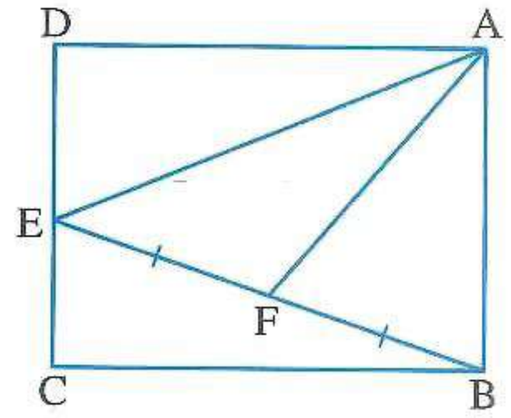
5 [a] In the opposite figure :

ABCD is a rectangle

, AB = 6 cm. , AD = 8 cm.

, E $\in \overline{CD}$, F is the midpoint of $\overline{EB}$

Find with proof : the area of triangle ABF

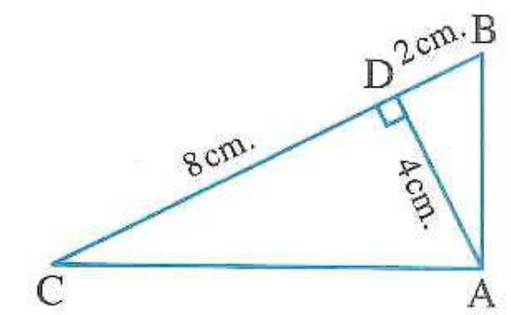


[b] In the opposite figure :

ABC is a triangle , $\overline{AD} \perp \overline{BC}$

, BD = 2 cm. , CD = 8 cm. , AD = 4 cm.

Prove that : m (∠ BAC) = 90°



7 El-Sharkia Governorate

G.L.S. Administration
Mathematics supervision (Model A)

Answer the following questions : *(Calculator is allowed)*

1 Choose the correct answer from the given :

1 A parallelogram whose side lengths are 5 cm. and 7 cm. and its smaller height is 4 cm. , then its area = ... cm^2.

(a) 20 (b) 28 (c) 35 (d) 170

2 The median of a triangle divides its surface into two triangular surfaces ..... .

(a) equal in area. (b) similar. (c) congruent. (d) isosceles.

3 The rhombus whose diagonals lengths are 6 cm. , 10 cm. has an area ..... cm^2.

(a) 60 (b) 30 (c) 15 (d) 10

4 The projection of the point (4 , 5) on the $\mathcal{X}$-axis is .....

(a) (0 , 5) (b) (0 , 0) (c) (– 4 , 5) (d) (4 , 0)

5 In Δ ABC , if D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$ respectively , BC = 8 cm. , then DE = ... cm.

(a) 16 (b) 8 (c) 4 (d) 2

---

2 Complete the following :

1 A square of area 32 cm^2. , then the length of its diagonal = ... cm.

2 If Δ ABC $\sim$ Δ DEF , AB = $\frac{1}{2}$ DE , AC = 5 cm. , then DF = ... cm.

3 ABC is a triangle in which : $(AC)^2 < (AB)^2 - (BC)^2$, then $\angle$ C is ..... angle.

4 The length of the projection of a line segment on a given straight line ..... the length of the original line segment.

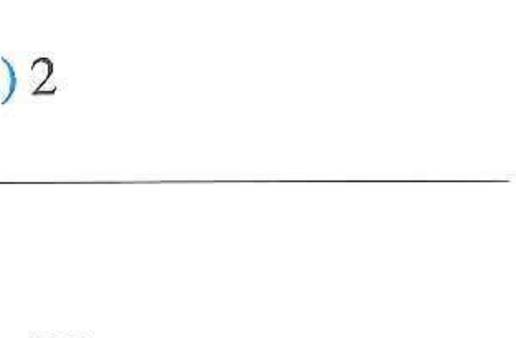
---

3 [a] In the opposite figure :

ABCD is a right trapezium at $\angle$ B , AD = 8 cm.

, BC = 18 cm. , AB = 10 cm.

Find : the area of the trapezium.



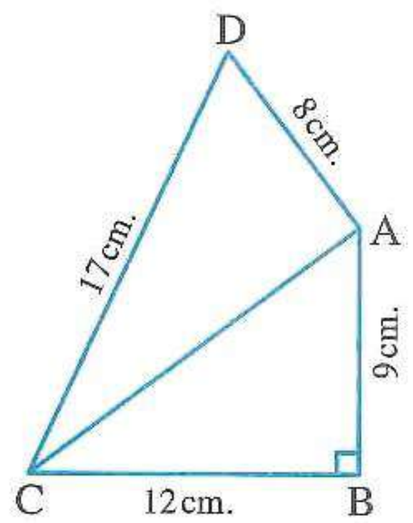
[b] In the opposite figure :

ABCD is a quadrilateral in which : m (∠ B) = 90°

, AB = 9 cm. , BC = 12 cm.

, CD = 17 cm. and DA = 8 cm.

Prove that : m (∠ DAC) = 90°



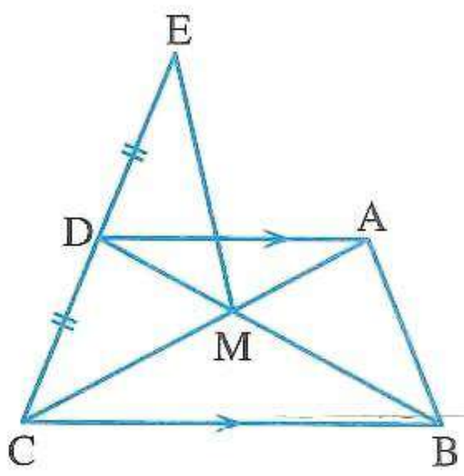
4 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$

, $\overline{AC} \cap \overline{BD} = \{M\}$

, D is the midpoint of $\overline{EC}$

Prove that : the area of Δ MDE = the area of Δ AMB



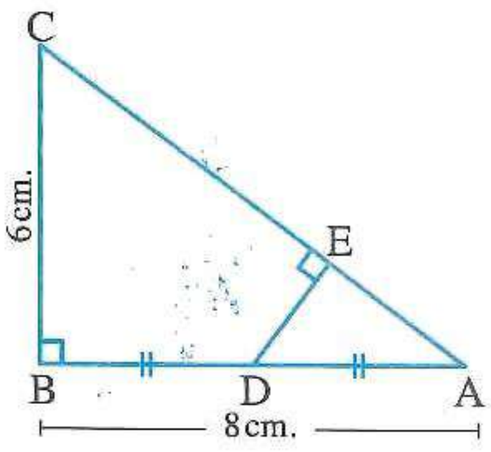
[b] In the opposite figure :

Δ ABC is a right-angled at B

, D is the midpoint of $\overline{AB}$, $\overline{DE} \perp \overline{AC}$

, AB = 8 cm. , BC = 6 cm.

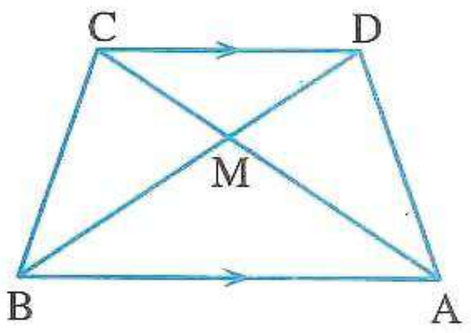
Prove that : Δ AED ~ Δ ABC , then find the length of $\overline{DE}$



5 [a] In the opposite figure :

$\overline{AB} \parallel \overline{CD}$, $\overline{AC} \cap \overline{BD} = \{M\}$

Prove that : the area of Δ DAM = the area of Δ CBM

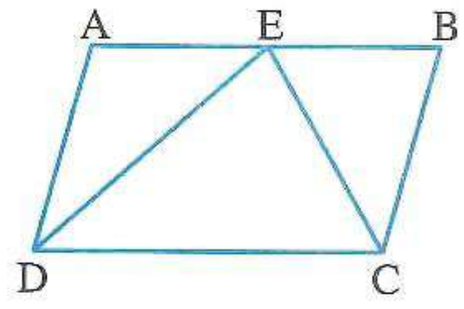


[b] In the opposite figure :

ABCD is a parallelogram

its area is 50 cm^2 , $E \in \overline{AB}$

Find : the area of Δ EDC



8 El-Gharbia Governorate

Central Mathematics Supervision
Official Language Schools

Answer the following questions :

1 Choose the correct answer from the given ones :

1 A rhombus whose perimeter is 40 cm. and the length of one of its diagonals is 12 cm. , then the length of other diagonal is ..... cm.

(a) 16 (b) 12 (c) 24 (d) 18

2 The ratio between the area of the parallelogram and the area of the triangle if they have a common base and included between two parallel straight lines equals .....

(a) 1 : 2 (b) 1 : 3 (c) 2 : 1 (d) 2 : 3

3 The ratio of minimizing of two similar polygons $\in$ .....

(a) $]0 , 1[$ (b) $[0 , 1]$ (c) $[1 , \infty]$ (d) $]1 , \infty[$

4 The projection of the point (5 , 3) on the y-axis is .....

(a) (5 , 0) (b) (0 , 3) (c) (0 , 5) (d) (3 , 0)

5 If ABC is a triangle in which : $(AC)^2 - (CB)^2 = (AB)^2$, then $\angle B$ is .....

(a) acute. (b) straight. (c) obtuse. (d) right.

---

2 Complete each of the following :

1 If the ratio of enlargement of two similar polygons is equal to 1 , then the two polygons are .....

2 If m ($\angle ABC$) = 60° , then m (reflex $\angle ABC$) = ... °

3 The isosceles triangle has ..... symmetry.

4 If $\overline{AB} \parallel \overleftrightarrow{CD}$, then the length of the projection of $\overline{AB}$ on $\overleftrightarrow{CD}$ equals the length of .....

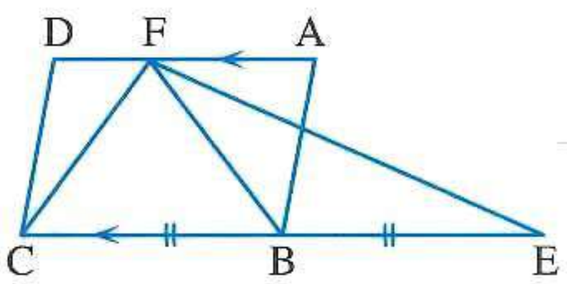
---

3 [a] In the opposite figure :

ABCD is a parallelogram , EB = BC

Prove that :

The area of Δ FEC = the area of $\square$ ABCD



[b] Determine the type of the greatest angle measure in Δ ABC :

AB = 4 cm. , BC = 7 cm. , AC = 4 cm.

---

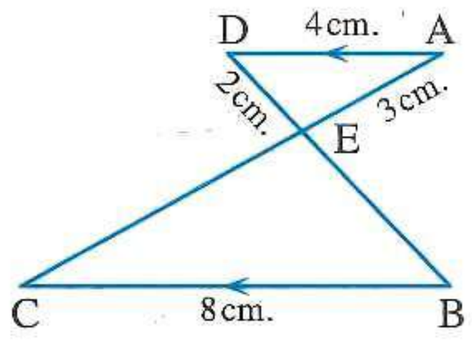
4 [a] In the opposite figure :

$\overline{AD} \parallel \overline{BC}$, AD = 4 cm.

, BC = 8 cm. , AE = 3 cm. , ED = 2 cm.

1 **Prove that :** $\Delta AED \sim \Delta CEB$

2 **Find :** the perimeter of Δ EBC



[b] In the opposite figure :

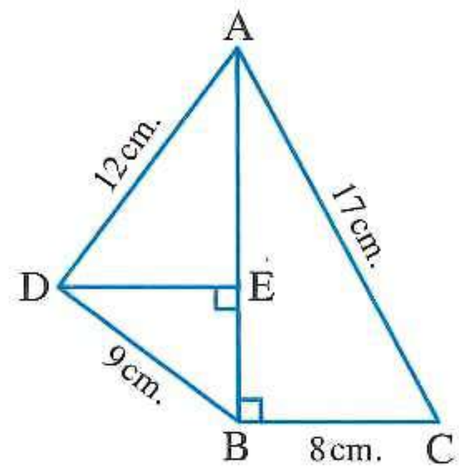
$\overline{DE} \perp \overline{AB}$, m ($\angle ABC$) = 90° , AD = 12 cm. ,

AC = 17 cm. , BC = 8 cm. , DB = 9 cm.

1 **Prove that :** m ($\angle ADB$) = 90°

2 **Find :** the length of $\overline{DE}$

3 **Find :** the length of the projection of $\overline{AD}$ on $\overleftrightarrow{AB}$



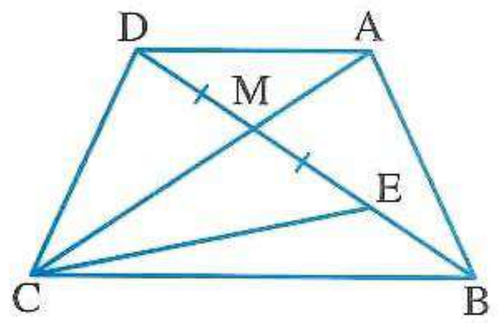
5 **[a]** The area of a trapezium is 88 cm^2 , its height is 8 cm. and the length of one of the two parallel bases is 10 cm. Find the length of the other base.

[b] In the opposite figure :

ME = MD

, the area of Δ AMB = the area of Δ CME

Prove that : $\overline{AD} \parallel \overline{BC}$



9 Ismailia Governorate

Directorate of education
Maths supervision

Answer the following questions :

1 **Choose the correct answer :**

1 The area of a rhombus of diagonal lengths 6 cm. and 8 cm. is ..... cm^2

(a) 48 (b) 24 (c) 28 (d) 25

2 The isosceles triangle has ..... of symmetry.

(a) one axis (b) two axes (c) three axes (d) four axes

3 In Δ ABC , if $(AC)^2 = (BC)^2 - (AB)^2$, then angle A is ..... angle.

(a) an acute (b) a right (c) an obtuse (d) a striaght

4 If $\overline{AD} \parallel \overleftrightarrow{XY}$, then the length of the projection of $\overline{AD}$ on $\overleftrightarrow{XY}$ ..... the length of $\overline{AD}$

(a) = (b) > (c) < (d) ≥

5 If Δ ABC ~ Δ DEF , and $AB = \frac{1}{4} DE$, then the perimeter of Δ ABC = ... the perimeter of Δ DEF

(a) 2 (b) 4 (c) $\frac{1}{4}$ (d) $\frac{1}{2}$

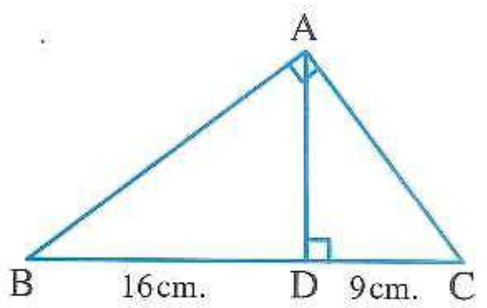
2 **Complete :**

1 In the parallelogram , the two diagonals .....

2 The length of the middle base of a trapezium is 7 cm. , and its area is 35 cm^2 , then its height = ... cm.

3 **In the opposite figure :**

AB × AC = ... × ..... = ... cm^2



4 If two polygons are similar , then the corresponding ..... are equal in measure.

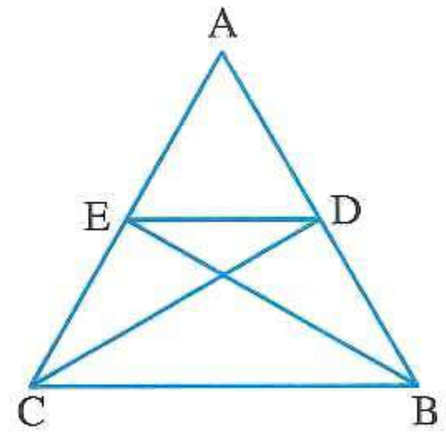
3 **[a] In the opposite figure :**

ABC is a triangle in which : $D \in \overline{AB}$

, $E \in \overline{AC}$

, the area of Δ ABE = the area of Δ ACD

Prove that : $\overline{DE} \,//\, \overline{CB}$



[b] In the opposite figure :

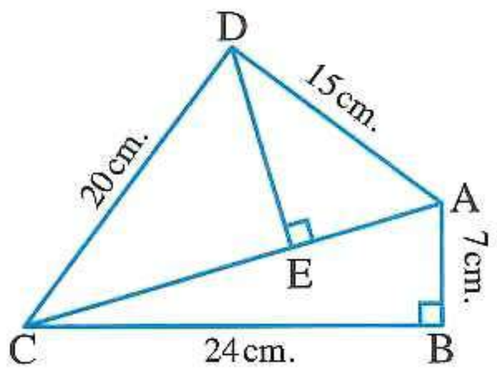
ABCD is a quadrilateral in which :

m ($\angle$ ABC) = 90° , AB = 7 cm. , BC = 24 cm. , CD = 20 cm.

and DA = 15 cm.

1 **Prove that :** m ($\angle$ ADC) = 90°

2 **Find :** the length of $\overline{DE}$



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4 **[a]** Determine the type of the triangle ABC according to its angles if AB = 3 cm. , BC = 4 cm. and AC = 5 cm.

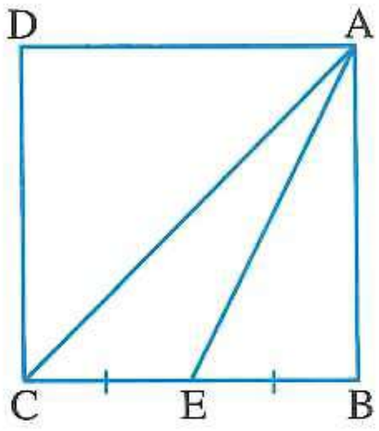
[b] In the opposite figure :

ABCD is a square

, its perimeter is 24 cm.

, E is the midpoint of $\overline{BC}$

Find with proof : the area of Δ AEC



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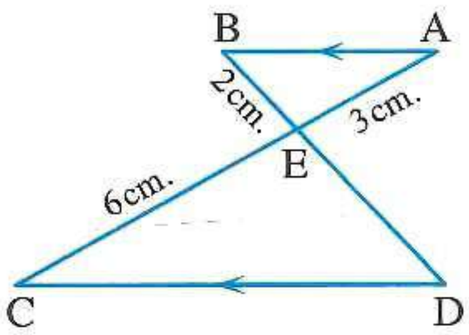
5 **[a] In the opposite figure :**

$\overline{AB} \,//\, \overline{DC}$, $\overline{AC} \cap \overline{BD} = \{E\}$

, AE = 3 cm. , BE = 2 cm. and EC = 6 cm.

1 **Prove that :** Δ ABE ~ Δ CDE

2 **Find :** the length of $\overline{DE}$



[b] In the opposite figure :

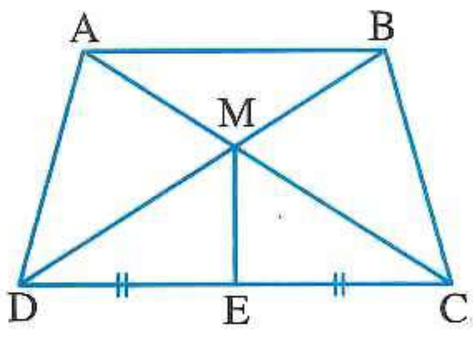
ABCD is a quadrilateral in which :

$\overline{AC} \cap \overline{BD} = \{M\}$, E is the midpoint of $\overline{DC}$

, the area of Δ MBC = the area of Δ MAD

Prove that :

The area of the figure ADEM = the area of the figure BCEM



10 Damietta Governorate

Faraskor Educational Zone Official Language School

Answer the following questions : *(Calculator is permitted)*

1 Choose the correct answer from those given :

1 The area of a rhombus is 24 cm^2 and the length of one of its diagonals is 4 cm. , then the length of the other diagonal = ... cm.

(a) 2 (b) 6 (c) 8 (d) 12

2 All ..... are similar.

(a) squares (b) rectangles (c) rhombuses (d) triangles

3 In Δ ABC , if $(AC)^2 > (AB)^2 + (BC)^2$, then the type of $\angle$ B is .....

(a) obtuse. (b) right. (c) straight. (d) acute.

4 ABCD is a parallelogram in which : m ($\angle$ A) + m ($\angle$ C) = 120° , then m ($\angle$ B) = ...

(a) 60° (b) 120° (c) 130° (d) 140°

5 The projection of a ray on a straight line not perpendicular to it is .....

(a) a point. (b) a line segment. (c) a ray. (d) a straight line.

2 Complete the following :

1 The measure of the interior angle of the regular octagon equals .....

2 If each of two polygons is similar to a third polygon, then they are .....

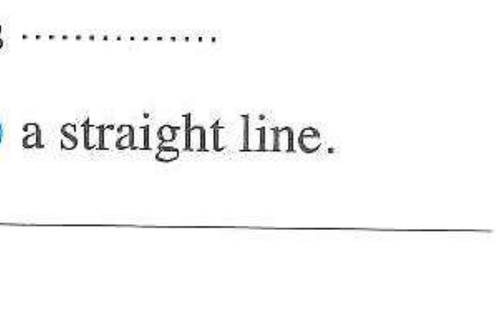
3 If the point A $\in$ the straight line L , then the projection of A on the straight line L is .....

4 The trapezium whose middle base length is 6 cm. and its height is 5 cm. , then its area is ..... cm^2.

3 [a] In the opposite figure :

The area of the Δ AMB = the area of the Δ CMD

Prove that : $\overline{AD} // \overline{BC}$



[b] Determine the type of the triangle ABC according to its angles where AB = 4 cm. , CA = 5 cm. , BC = 7 cm.

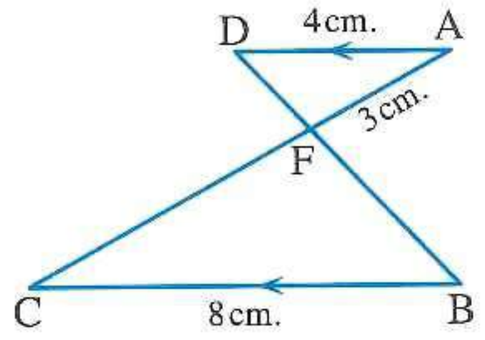
4 **[a] In the opposite figure :**

$\overline{AD} // \overline{BC}$, AD = 4 cm.

, CB = 8 cm. , AF = 3 cm.

1 **Prove that :** $\Delta AFD \sim \Delta CFB$

2 **Find :** the length of $\overline{CF}$



[b] In the opposite figure :

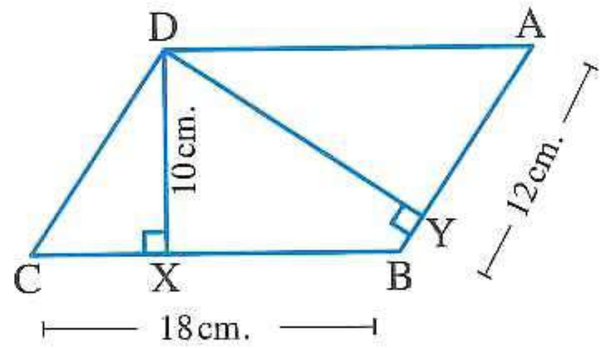
ABCD is a parallelogram , AB = 12 cm.

, BC = 18 cm. , XD = 10 cm.

Find :

1 The area of the parallelogram.

2 The length of $\overline{DY}$



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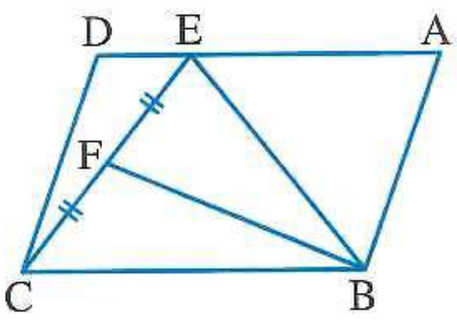
5 **[a] In the opposite figure :**

ABCD is a parallelogram whose area is 40 cm^2.

, F is the midpoint of $\overline{EC}$, $E \in \overline{AD}$

Find with proof : the area of the ΔBEF

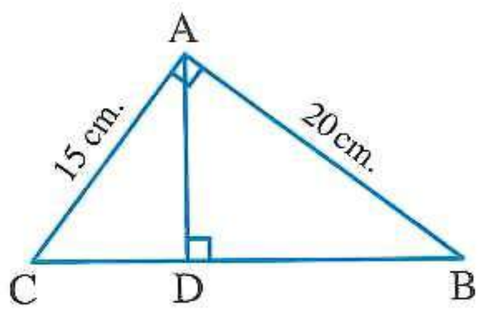


[b] In the opposite figure :

ABC is a triangle , m ($\angle BAC$) = 90°

, $\overline{AD} \perp \overline{BC}$, BA = 20 cm. , AC = 15 cm.

Find with proof : the length of $\overline{BC}$ and $\overline{AD}$



11 **El-Fayoum Governorate** Education Directorate

Answer the following questions : ***(Calculator is allowed)***

1 **Complete each of the following :**

1 In the triangle ABC , if $(AB)^2 = (AC)^2 - (BC)^2$, then m ($\angle$ .....) = 90°

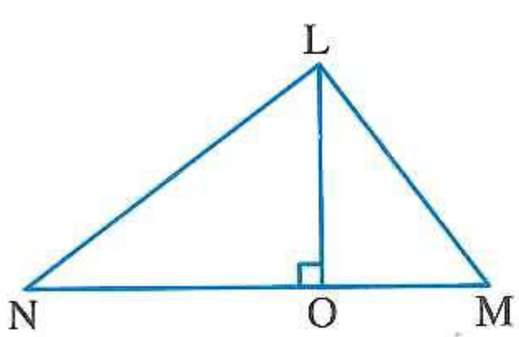
2 If $\Delta ABC \sim \Delta XYZ$, m ($\angle A$) = 110° , m ($\angle B$) = 60° , then m ($\angle Z$) = ... °

3 A rhombus whose diagonal lengths are 10 cm. and 12 cm.

, its area = ... cm^2.

4 **In the opposite figure :**

$(LO)^2$ = ON × .....



2 Choose the correct answer from the given answer :

1 If the area of a trapezium = 180 cm^2 and the lengths of its two parallel bases are 16 cm. and 20 cm. , then its height = ... cm.

(a) 8 (b) 10 (c) 12 (d) 18

2 If ABC is a triangle in which : AB = 10 cm. , BC = 4 cm. , then AC could be ..... cm.

(a) 4 (b) 5 (c) 6 (d) 7

3 If ABCD is a square , then the projection of $\overline{BD}$ on $\overleftrightarrow{BC}$ is .....

(a) $\overline{BC}$ (b) $\overline{BD}$ (c) $\overline{AB}$ (d) $\overline{AD}$

4 If two vertically opposite angles are complementary , then the measure of each angle equals .....

(a) 60° (b) 90° (c) 50° (d) 45°

5 The sum of the measures of the interior angles of a triangle = ...

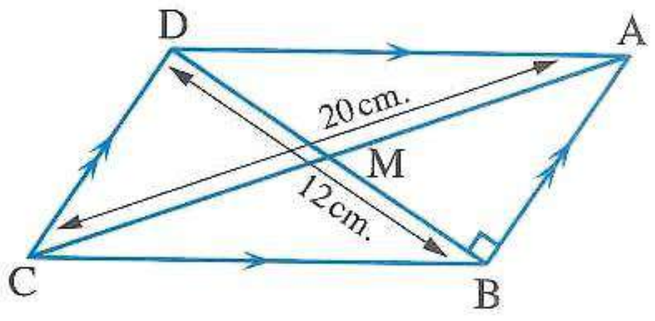
(a) 90° (b) 180° (c) 360° (d) 120°

---

3 [a] In the opposite figure :

ABCD is a parallelogram , AC = 20 cm. , BD = 12 cm. , m (∠ ABD) = 90°

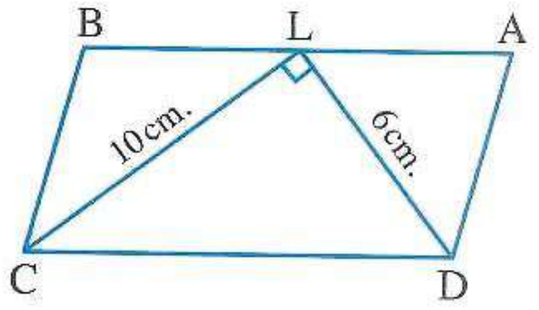
Find : the area of the parallelogram ABCD



[b] In the opposite figure :

ABCD is a parallelogram , DL = 6 cm. , CL = 10 cm. , m (∠ CLD) = 90°

Find : the area of the parallelogram ABCD



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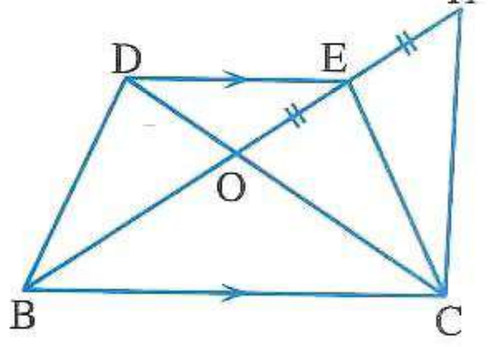
4 [a] In the opposite figure :

$\overline{BC} \parallel \overline{DE}$, $H \in \overrightarrow{BE}$, HE = EO

Prove that : the area of Δ HEC = the area of Δ DOB

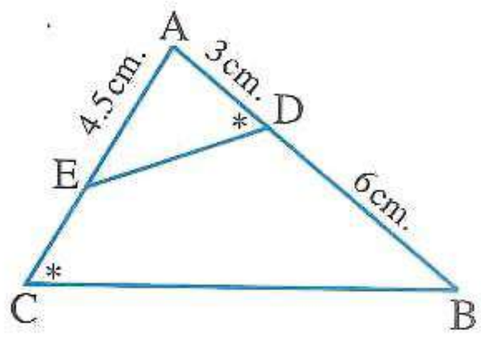


[b] In the opposite figure :

m (∠ C) = m (∠ ADE) , AD = 3 cm. , AE = 4.5 , DB = 6 cm.

1 **Prove that :** Δ ADE ~ Δ ACB

2 **Find :** CE

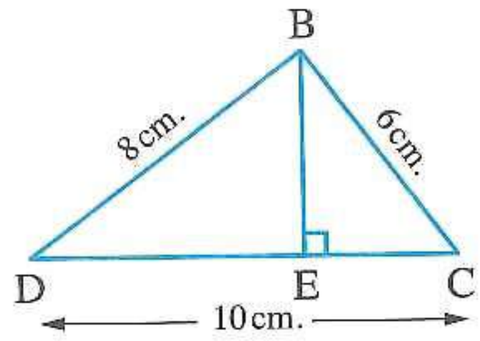


5 [a] In the opposite figure :

BCD is a triangle

, BC = 6 cm. , BD = 8 cm. , DC = 10 cm. , $\overline{BE} \perp \overline{DC}$

Find : 1 BE 2 CE

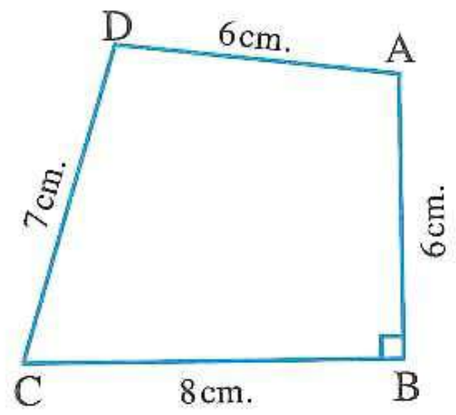


[b] In the opposite figure :

m (∠ B) = 90°

Prove that :

ADC is an obtuse-angled triangle.



12 Red Sea Governorate

The Educational Directorate
Maths Supervision

Answer the following questions :

1 Choose the correct answer :

1 The area of a rhombus whose diagonals lengths are 8 cm. and 6 cm. is ..... cm^2.

(a) 14 (b) 20 (c) 24 (d) 8

2 The two diagonals are perpendicular and equal in length in .....

(a) rectangle. (b) square. (c) rhombus. (d) trapezium.

3 In Δ ABC , if $(AB)^2 > (BC)^2 + (AC)^2$, then the angle C is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

4 In two similar polygons their corresponding angles are ..... in measure.

(a) equal (b) different (c) proportional (d) alternative

5 The length of the projection of a line segment on a given straight line ..... the length of the line segment itself.

(a) > (b) = (c) ≥ (d) ≤

2 Complete the following :

1 A square its diagonal length is 6 cm. , then its area = ... cm^2.

2 The measure of the exterior angle of the equilateral triangle equals .....

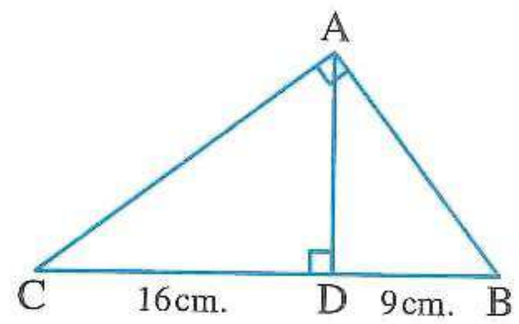
3 If ABCD is a parallelogram , AB = 10 cm. , BC = 8 cm. and its greater height is 5 cm. , then its area is .....

4 If the lengths of two parallel bases of a trapezium are 15 cm. and 11 cm. , then the length of its middle bases is .....

3 **[a] In the opposite figure :**

Δ ABC is right-angled at A ,

$\overline{AD} \perp \overline{BC}$, BD = 9 cm. , CD = 16 cm.



Find : 1 The length of the projection of $\overline{CB}$ on $\overleftrightarrow{AB}$

2 The projection of $\overline{AD}$ on $\overleftrightarrow{BC}$

3 The length of $\overline{AD}$

[b] Find the area of a trapezium whose lengths of two parallel bases are 5 cm. and 9 cm. and its height 4 cm.

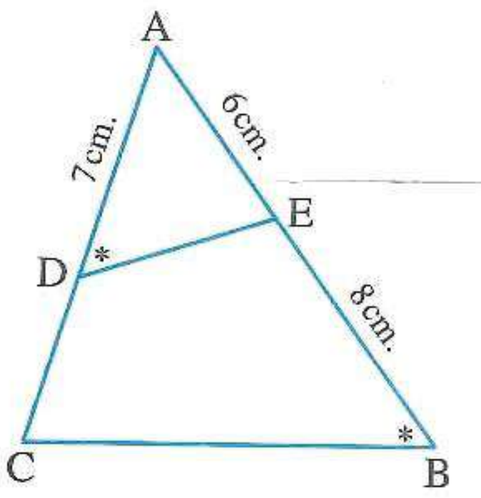
---

4 **[a] In the opposite figure :**

m ($\angle$ ADE) = m ($\angle$ B)

, AD = 7 cm.

, AE = 6 cm. , EB = 8 cm.



1 **Prove that :** Δ ADE $\sim$ Δ ABC

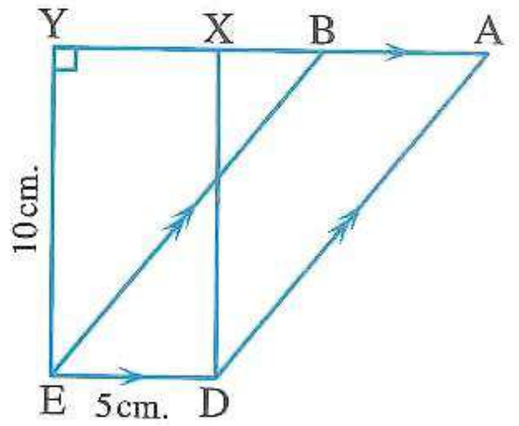
2 **Find :** the length of $\overline{DC}$

[b] In the opposite figure :

$\overleftrightarrow{AB} \,//\, \overleftrightarrow{DE}$, $X \in \overrightarrow{AB}$, $Y \in \overrightarrow{AB}$

, EDXY is a rectangle

, $\overline{AD} \,//\, \overline{EB}$, ED = 5 cm. , EY = 10 cm.



Find with proof : the area of the parallelogram ABED

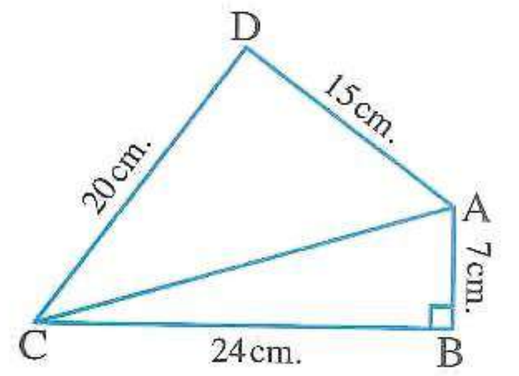
---

5 **[a] In the opposite figure :**

ABCD is a quadrilateral in which : m ($\angle$ B) = 90°

, AB = 7 cm. , BC = 24 cm.

, CD = 20 cm. , AD = 15 cm.



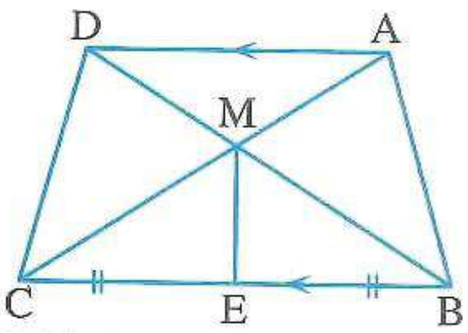
Prove that : m ($\angle$ D) = 90°

[b] In the opposite figure :

$\overline{AD} \,//\, \overline{BC}$,

$\overline{AC} \cap \overline{BD} = \{M\}$

, E is the midpoint of $\overline{BC}$



Prove that : the area of the figure ABEM = the area of the figure DCEM

Answers of the schools examinations on Geometry

1 Cairo

1

1 (d) 2 (b) 3 (c) 4 (b) 5 (d)

2

1 100 2 ∠ B 3 360° 4 120°

3

[a] ∵ $40 = \frac{1}{2}$ the length of the middle base × 6

∴ The length of the middle base = $\frac{2 \times 40}{6} = 13.3$ cm.

[b] ∵ The area of Δ ABM = The area of Δ DCM

Adding the area of Δ BCM to both sides.

∴ The area of Δ ABC = The area of Δ DCB

and they have a common base $\overline{BC}$ and on one side of it.

∴ $\overline{AD} \parallel \overline{BC}$ (Q.E.D.)

4

[a] In ΔΔ ABC , AXY :

∵ $\overline{XY} \parallel \overline{BC}$, $\overleftrightarrow{AB}$ is a transversal.

∴ m (∠ B) = m (∠ AXY) (corresponding angles)

, ∵ $\overline{XY} \parallel \overline{BC}$, $\overleftrightarrow{AC}$ is a transversal.

∴ m (∠ C) = m (∠ AYX) (corresponding angles)

, ∵ ∠ A is a common angle

∴ Δ ABC ~ Δ AXY (First req.)

, ∵ $\frac{AB}{AX} = \frac{AC}{AY}$

∴ $\frac{6}{2} = \frac{AC}{3}$ ∴ AC = 3 × 3 = 9 cm.

∴ YC = AC − AY = 9 − 3 = 6 cm. (Second req.)

[b] ∵ Δ EBC , ▱ ABCD have the common base $\overline{BC}$

, E ∈ $\overline{AD}$

∴ The area of Δ EBC = $\frac{1}{2}$ the area of ▱ ABCD

$= \frac{1}{2} \times 40 = 20$ cm.²

, ∵ O is the midpoint of $\overline{CE}$

∴ $\overline{BO}$ is a median in Δ BEC

∴ The area of Δ BEO

$= \frac{1}{2}$ the area of Δ BEC

$= \frac{1}{2} \times 20 = 10$ cm.² (The req.)

5

[a] In Δ ABC : ∵ m (∠ BAC) = 90°

, $\overline{AD} \perp \overline{BC}$

∴ $(AB)^2 = BD \times BC = 16 \times 25 = 400$

∴ AB = 20 cm. (First req.)

, $(AD)^2 = DB \times DC = 16 \times 9 = 144$

∴ AD = 12 cm. (Second req.)

[b] In ABC : ∵ m (∠ B) = 90°

∴ $(AC)^2 = (AB)^2 + (BC)^2 = (3)^2 + (4)^2 = 25$

∴ AC = 5 cm.

In Δ ADC : ∵ $(AD)^2 = (13)^2 = 169$

, $(AC)^2 + (CD)^2 = (5)^2 + (12)^2 = 169$

∴ $(AD)^2 = (AC)^2 + (CD)^2$

∴ m (∠ ACD) = 90° (Q.E.D.)

2 Cairo

1

1 (c) 2 (d) 3 (a) 4 (d) 5 (c)

2

1 zero 2 18

3 equal in measure 4 70°

3

[a] In Δ ABC : ∵ $(AC)^2 = (15)^2 = 225$

, $(AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$

∴ $(AC)^2 = (AB)^2 + (BC)^2$

∴ Δ ABC is a right-angled triangle (The req.)

[b] In Δ ABD : ∵ m (∠ ABD) = 90°

∴ $(BD)^2 = (AD)^2 - (AB)^2 = (17)^2 - (8)^2 = 225$

∴ BD = 15 cm. (First req.)

In Δ BCD : ∵ $(BC)^2 + (CD)^2 = (9)^2 + (12)^2 = 225$

, $(BD)^2 = 225$ ∴ $(BD)^2 = (BC)^2 + (CD)^2$

∴ m (∠ C) = 90° (Second req.)

4

[a] The area of the trapezium $= \frac{1}{2}(14+6) \times 3 = 30$ cm^2

, the area of the rhombus $= \frac{1}{2} \times 6 \times 8 = 24$ cm^2

$\therefore$ The area of the trapezium greater than the area of the rhombus (The req.)

[b] In $\Delta\Delta$ AED , ABC :

$\because \overline{ED} // \overline{BC}$, $\overleftrightarrow{AB}$ is a transversal.

$\therefore m(\angle AED) = m(\angle B)$ (corresponding angles)

, $\because \overline{ED} // \overline{BC}$, $\overleftrightarrow{AC}$ is a transversal.

$\therefore m(\angle ADE) = m(\angle C)$ (corresponding angles)

, $\because \angle A$ is a common angle

$\therefore \Delta AED \sim \Delta ABC$ (First req.)

, $\because \frac{ED}{BC} = \frac{AD}{AC}$ $\quad \therefore \frac{ED}{18} = \frac{4}{12}$

$\therefore ED = \frac{18 \times 4}{12} = 6$ cm. (Second req.)

5

[a] $\because \overleftrightarrow{AB} // \overleftrightarrow{DE}$, $\because \overline{AD} // \overline{BE}$

$\therefore$ ABED is a parallelogram.

, $\because$ the rectangle XDEY and the parallelogram ABED have the common base $\overline{ED}$

, $\because \overleftrightarrow{AB} // \overleftrightarrow{DE}$

$\therefore$ The area of $\square$ ABED = the area of $\square$ XDEY

, $\because$ The area of $\square$ XDEY $= 12 \times 24 = 288$ cm^2 (The req.)

$\therefore$ The area of $\square$ ABED $= 288$ cm^2

[b] In Δ ABC : $\because m(\angle BAC) = 90°$

$\therefore (BC)^2 = (AB)^2 + (AC)^2 = (12)^2 + (16)^2 = 400$

$\therefore BC = 20$ cm.

, $\because \overline{AD} \perp \overline{BC}$

$\therefore AD = \frac{AB \times AC}{BC} = \frac{12 \times 16}{20} = 9.6$ cm. (The req.)

3 Giza

1

1 (d) 2 (c) 3 (b) 4 (c) 5 (c)

2

1 proportional. 2 a right angle.

3 equal in area 4 the same point.

3

[a] In Δ ABC : $\because m(\angle BAC) = 90°$

, $\overline{AD} \perp \overline{BC}$

$\therefore (AC)^2 = CD \times CB = 16 \times 25 = 400$

$\therefore AC = 20$ cm. (First req.)

, $(AB)^2 = BD \times BC = 9 \times 25 = 225$

$\therefore AB = 15$ cm. (Second req.)

, $(AD)^2 = DB \times DC = 9 \times 16 = 144$

$\therefore AD = 12$ cm. (Third req.)

[b] In Δ ABC : $\because (BC)^2 = (10)^2 = 100$

, $(AB)^2 + (AC)^2 = (7)^2 + (8)^2 = 113$

$\therefore (BC)^2 < (AB)^2 + (AC)^2$

$\therefore \Delta$ ABC is an acute-angled triangle. (The req.)

4

[a] In Δ ABC : $\because m(\angle B) = 90°$

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$

In Δ ACD : $\because (AC)^2 = 625$

, $(AD)^2 + (CD)^2 = (15)^2 + (20)^2 = 625$

$\therefore (AC)^2 = (AD)^2 + (CD)^2$

$\therefore m(\angle D) = 90°$ (Q.E.D.)

[b] $\because \Delta$ EBC , $\square$ ABCD have a common base $\overline{BC}$, $E \in \overline{AD}$

$\therefore$ The area of Δ EBC $= \frac{1}{2}$ the area of $\square$ ABCD

but the area of $\square$ ABCD = the area of $\square$ ABMN (have a common base $\overline{AB}$ and between two parallel straight lines $\overleftrightarrow{AB}$, $\overleftrightarrow{CN}$)

$\therefore$ The area of Δ EBC $= \frac{1}{2}$ the area of $\square$ ABMN (Q.E.D.)

5

[a] In $\Delta\Delta$ AOD , COB

$\because \overline{DA} // \overline{CB}$, $\overleftrightarrow{AC}$ is a transversal.

$\therefore m(\angle A) = m(\angle C)$ (alternate angles)

, $\because \overline{DA} // \overline{CB}$, $\overleftrightarrow{BD}$ is a transversal.

$\therefore$ m ($\angle$ D) = m ($\angle$ B) (alternate angles)

, $\because$ m ($\angle$ AOD) = m ($\angle$ BOC) (V.O.A.)

$\therefore$ Δ AOD ~ Δ COB (First req.)

, $\frac{AO}{CO} = \frac{AD}{CB}$

$\therefore$ $\frac{AO}{8} = \frac{3}{6}$

$\therefore$ AO = $\frac{3 \times 8}{6}$ = 4 cm. (Second req.)

[b] $\because$ The area of Δ ABM = The area of Δ DCM

Adding the area of Δ CMB to both sides

$\therefore$ The area of Δ ACB = The area of Δ DBC

and they have a common base $\overline{BC}$ and on one side of it

$\therefore$ $\overline{AD} \parallel \overline{BC}$ (Q.E.D.)

4 Giza

1

1 (a) 2 (c) 3 (b) 4 (d) 5 (a)

2

1 12 2 8

3 34 4 an obtuse-angled triangle.

3

[a] $\because$ The area of the square = $\frac{1}{2} r^2$

$\therefore$ $18 = \frac{1}{2} r^2$ $\therefore$ $r^2 = 36$ $\therefore$ r = 6 cm.

$\therefore$ The length of the diagonal = 6 cm. (The req.)

[b] $\because$ $\Delta\Delta$ ACD , BCD have a common base $\overline{CD}$

, $\overline{AB} \parallel \overline{CD}$

$\therefore$ The area of Δ ACD = The area of Δ BCD

Subtracting the area of Δ MCD from both sides

$\therefore$ The area of Δ MAD = The area of Δ BMC (Q.E.D.)

4

[a] The area of the rhombus = $\frac{1}{2} \times 16 \times 12 = 96$ cm^2

[b] In $\Delta\Delta$ ABF , DCF

$\because$ $\overline{AB} \parallel \overline{CD}$, $\overleftrightarrow{AD}$ is a transversal.

$\therefore$ m ($\angle$ A) = m ($\angle$ D) (alternate angles)

, $\because$ $\overline{AB} \parallel \overline{CD}$, $\overleftrightarrow{BC}$ is a transversal.

$\therefore$ m ($\angle$ B) = m ($\angle$ C) (alternate angles)

, $\because$ m ($\angle$ AFB) = m ($\angle$ CFD) (V.O.A.)

$\therefore$ Δ ABF ~ Δ DCF (First req.)

, $\frac{AB}{DC} = \frac{BF}{CF}$

$\therefore$ $\frac{4}{DC} = \frac{2}{3}$

$\therefore$ CD = $\frac{4 \times 3}{2}$ = 6 cm. (Second req.)

5

[a] In Δ ABC : $\because$ m ($\angle$ B) = 90°

$\therefore$ $(AC)^2 = (AB)^2 + (BC)^2 = (5)^2 + (12)^2 = 169$

$\therefore$ AC = 13 cm. (First req.)

, the area = $\frac{1}{2}$ BC $\times$ AB

= $\frac{1}{2} \times 12 \times 5 = 30$ cm^2. (Second req.)

[b] In Δ ABC : $\because$ m ($\angle$ BAC) = 90°

, $\overline{AD} \perp \overline{BC}$

$\therefore$ $(AD)^2 = DB \times DC = 9 \times 16 = 144$

$\therefore$ AD = 12 cm. (First req.)

, $(AC)^2 = CD \times CB = 16 \times 25 = 400$

$\therefore$ AC = 20 cm. (Second req.)

5 Alexandria

1

1 (c) 2 (b) 3 (d) 4 (a) 5 (b)

2

1 proportional 2 C

3 180° 4 $\overline{BC}$

3

[a] $\because$ $\Delta\Delta$ ABC , BCD have a common base $\overline{BC}$

, $\overline{AD} \parallel \overline{BC}$

$\therefore$ The area of Δ ABC = The area of Δ BCD

Subtracting the area of Δ MBC from both sides.

$\therefore$ The area of Δ ABM = The area of Δ DCM

(Q.E.D.)

[b] 1 The length of the middle base

= $\frac{1}{2}$ (24 + 12) = 18 cm. (First req.)

2 The area of the trapezium = $18 \times 15 = 270$ cm^2.

(Second req.)

4

[a] $\because \Delta ABC \sim \Delta AED$

$\therefore \frac{AB}{AE} = \frac{BC}{ED} = \frac{AC}{AD}$ $\therefore \frac{14}{7} = \frac{AC}{6}$

$\therefore AC = \frac{14 \times 6}{7} = 12$ cm.

$\therefore EC = AC - AE = 12 - 7 = 5$ cm. (First req.)

, $\frac{DE}{BC} = \frac{AD}{AC} = \frac{6}{12} = \frac{1}{2}$ (Second req.)

[b] In ΔABC : $\because (AC)^2 = (9)^2 = 81$

, $(AB)^2 + (BC)^2 = (6)^2 + (8)^2 = 100$

$\therefore (AC)^2 < (AB)^2 + (BC)^2$

$\therefore \Delta ABC$ is an acute-angled triangle. (The req.)

5

[a] $\because \overline{AD}$ is a median in ΔABC

$\therefore$ The area of ΔABD = The area of ΔACD (1)

, $\because \overline{ED}$ is a median in ΔBEC

$\therefore$ The area of ΔEBD = The area of ΔECD (2)

Subtracting (2) from (1) :

$\therefore$ The area of ΔABE = The area of ΔACE

(Q.E.D.)

[b] In ΔABC : $\because m(\angle A) = 90°$

, $\overline{AD} \perp \overline{BC}$

$\therefore (AB)^2 = BD \times BC = 16 \times 25 = 400$

$\therefore AB = 20$ cm. (First req.)

, $(AC)^2 = CD \times CB = 9 \times 25 = 225$

$\therefore AC = 15$ cm. (Second req.)

, $(AD)^2 = DC \times DB = 9 \times 16 = 144$

$\therefore AD = 12$ cm. (Third req.)

6 El-Kalyoubia

1

1 (a) 2 (b) 3 (a) 4 (b) 5 (b)

2

1 8 2 similar

3 propartional 4 120

3

[a] $\because \Delta\Delta ADB$, ADC have the same base $\overline{AD}$

, $\overline{AD} // \overline{BC}$

$\therefore$ The area of ΔADB = The area of ΔADC

Subtrating the area of ΔAMD from both sides.

$\therefore$ The area of ΔAMB = The area of ΔDMC (1)

, $\because \overline{MD}$ is a median in ΔEMC

$\therefore$ The area of ΔMDE = The area of ΔDMC (2)

From (1) and (2) :

$\therefore$ The area of ΔAMB = The area of ΔDME

(Q.E.D.)

[b] $\because \Delta ADE \sim \Delta ACB$

$\therefore \frac{AD}{AC} = \frac{AE}{AB}$ $\therefore \frac{6}{AC} = \frac{7}{14}$

$\therefore AC = \frac{6 \times 14}{7} = 12$ cm.

$\therefore EC = AC - AE = 12 - 7 = 5$ cm. (The req.)

4

[a] In ΔABC :

$\because m(\angle BAC) = 90°$, $\overline{AD} \perp \overline{BC}$

$\therefore (AB)^2 = BD \times BC = 9 \times 25 = 225$

$\therefore AB = 15$ cm. (First req.)

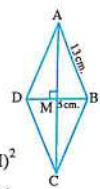
, $(AD)^2 = DB \times DC = 9 \times 16 = 144$

$\therefore AD = 12$ cm. (Second req.)

[b] $\because$ The perimeter of the rhombus = 52 cm.

$\therefore$ The side length of the rhombus = $\frac{52}{4} = 13$ cm.

Drawing the rhombus as shown in the figure such that BD = 10 cm.



$\therefore BM = 5$ cm.

$\because \overline{AC} \perp \overline{BD}$

$\therefore m(\angle AMB) = 90°$

$\therefore$ In ΔABM : $(AM)^2 = (AB)^2 - (BM)^2$

$= (13)^2 - (5)^2 = 144$

$\therefore AM = 12$ cm. $\therefore AC = 24$ cm.

$\therefore$ The area of the rhombus = $\frac{1}{2} \times 10 \times 24 = 120$ cm^2.

(The req.)

5

[a] The area of $\square ABCD = 6 \times 8 = 48$ cm^2.

, $\because \square ABCD$, ΔABE have the same base $\overline{AB}$

, $E \in \overline{CD}$

$\therefore$ The area of $\Delta ABE = \frac{1}{2}$ The area of $\square ABCD$

$= \frac{48}{2} = 24$ cm^2.

$\because \overline{AF}$ is a median in ΔABE

$\therefore$ The area of triangle $ABF = \frac{1}{2}$ the area of $\Delta ABE = \frac{24}{2} = 12$ cm^2. (The req.)

[b] $\because \overline{AD} \perp \overline{BC}$

$\therefore$ In ΔABD : m $(\angle ADB) = 90°$

$\therefore (AB)^2 = (AD)^2 + (BD)^2 = (4)^2 + (2)^2 = 20$

, In ΔACD : $\because$ m $(\angle ADC) = 90°$

$\therefore (AC)^2 = (AD)^2 + (CD)^2 = (4)^2 + (8)^2 = 80$

In ΔABC : $\because (BC)^2 = (10)^2 = 100$

, $(AB)^2 + (AC)^2 = 20 + 80 = 100$

$\therefore (BC)^2 = (AB)^2 + (AC)^2$

$\therefore$ m $(\angle BAC) = 90°$ (Q.E.D.)

7 El-Sharkia

1

1 (b) 2 (a) 3 (b) 4 (d) 5 (c)

2

1 8 2 10 3 an obtuse. 4 $\leq$

3

[a] The length of middle base $= \frac{1}{2}(8 + 18) = 13$ cm.

the area of the trapezium $= 13 \times 10 = 130$ cm^2.

[b] In ΔABC : $\because$ m $(\angle B) = 90°$ (The req.)

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$

$\therefore AC = 15$ cm.

In ΔACD : $\because (CD)^2 = (17)^2 = 289$

, $(AD)^2 + (AC)^2 = (8)^2 + (15)^2 = 289$

$\therefore (CD)^2 = (AD)^2 + (AC)^2$

$\therefore$ m $(\angle DAC) = 90°$ (Q.E.D.)

4

[a] $\because \Delta\Delta ADB$, ADC have the same base $\overline{AD}$

, $\overline{AD} // \overline{BC}$

$\therefore$ The area of ΔADB = The area of ΔADC

Subtracting the area of ΔAMD from both sides.

$\therefore$ The area of ΔAMB = The area of ΔDMC (1)

, $\because \overline{MD}$ is a median in ΔEMC

$\therefore$ The area of ΔMDE = The area of ΔDMC (2)

From (1) and (2) :

$\therefore$ The area of ΔMDE = The area of ΔAMB

(Q.E.D.)

[b] In ΔABC : $\because$ m $(\angle B) = 90°$

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (8)^2 + (6)^2 = 100$

$\therefore AC = 10$ cm.

, $\because D$ is the midpoint of $\overline{AB}$

$\therefore AD = DB = 4$ cm.

In $\Delta\Delta AED$, ABC :

m $(\angle AED)$ = m $(\angle B) = 90°$ (given)

, $\angle A$ is common

$\therefore$ m $(\angle ADE)$ = m $(\angle ACB)$

$\therefore \Delta AED \sim \Delta ABC$ (First req.)

$\therefore \frac{DE}{CB} = \frac{AD}{AC}$ $\therefore \frac{DE}{6} = \frac{4}{10}$

$\therefore DE = \frac{6 \times 4}{10} = 2.4$ cm. (Second req.)

5

[a] $\because \Delta\Delta ACD$, BCD have the same base $\overline{CD}$

, $\overline{AB} // \overline{CD}$

$\therefore$ The area of ΔACD = The area of ΔBCD

Subtracting the area of ΔCMD from both sides

$\therefore$ The area of ΔDAM = The area of ΔCBM

(Q.E.D.)

[b] $\because \Delta EDC$, $\parallel ABCD$ have the common base

$\overline{CD}$, $E \in \overline{AB}$

$\therefore$ The area of $\Delta EDC = \frac{1}{2}$ the area of $\parallel ABCD$

$= \frac{1}{2} \times 50 = 25$ cm^2.

(The req.)

8 El-Gharbia

1

[1] (a) [2] (c) [3] (a) [4] (b) [5] (d)

2

[1] congruent [2] 300°

[3] one axis [4] $\overline{AB}$

3

[a] $\because$ Δ BFC , $\square$ ABCD have the common base $\overline{BC}$, $F \in \overline{AD}$

$\therefore$ The area of Δ BFC = $\frac{1}{2}$ The area of $\square$ ABCD (1)

$\because$ $\overline{FB}$ is a median in Δ FEC

$\therefore$ The area of Δ BFC = $\frac{1}{2}$ The area of Δ FEC (2)

From (1) and (2) :

$\therefore$ The area of Δ FEC = The area of $\square$ ABCD

(Q.E.D.)

[b] In Δ ABC : $\because$ $(BC)^2 = (7)^2 = 49$

, $(AB)^2 + (AC)^2 = (4)^2 + (4)^2 = 32$

$\therefore$ $(BC)^2 > (AB)^2 + (AC)^2$

$\therefore$ $\angle$ A is an obtuse angle. (The req.)

4

[a] In $\Delta\Delta$ AED , CEB :

$\because$ $\overline{AD} // \overline{BC}$, $\overleftrightarrow{AC}$ is a transversal.

$\therefore$ m ($\angle$ A) = m ($\angle$ C) (alternate angles)

, $\because$ $\overline{AD} // \overline{BC}$, $\overleftrightarrow{DB}$ is a transversal.

$\therefore$ m ($\angle$ D) = m ($\angle$ B) (alternate angles)

, $\because$ m ($\angle$ AED) = m ($\angle$ CEB) (V.O.A.)

$\therefore$ Δ AED ~ Δ CEB (First req.)

, $\frac{AE}{CE} = \frac{DE}{BE} = \frac{AD}{BC}$ $\therefore$ $\frac{3}{CE} = \frac{2}{BE} = \frac{4}{8}$

$\therefore$ $CE = \frac{3 \times 8}{4} = 6$ cm. , $BE = \frac{2 \times 8}{4} = 4$ cm.

$\therefore$ The perimeter of Δ EBC = 6 + 4 + 8 = 18 cm.

(Second req.)

[b] In Δ ABC : $\because$ m ($\angle$ ABC) = 90°

$\therefore$ $(AB)^2 = (AC)^2 - (BC)^2 = (17)^2 - (8)^2 = 225$

$\therefore$ AB = 15 cm.

In Δ ABD : $\because$ $(AB)^2 = 225$

, $(AD)^2 + (BD)^2 = (12)^2 + (9)^2 = 225$

$\therefore$ $(AB)^2 = (AD)^2 + (BD)^2$

$\therefore$ m ($\angle$ ADB) = 90° (First req.)

, $\because$ $\overline{DE} \perp \overline{AB}$

$\therefore$ $DE = \frac{AD \times BD}{AB} = \frac{12 \times 9}{15} = 7.2$ cm. (Second req.)

$\because$ $\overline{AE}$ is the projection of $\overline{AD}$ on $\overline{AB}$

In Δ ABD : $\because$ m ($\angle$ ADB) = 90°

, $\overline{DE} \perp \overline{AB}$

$\therefore$ $(AD)^2 = AE \times AB$ $\therefore$ $(12)^2 = AE \times 15$

$\therefore$ $AE = \frac{144}{15} = 9.6$ cm. (Third req.)

5

[a] $\because$ The area of the trapezium = $\frac{1}{2}$ $(b_1 + b_2) \times h$

$\therefore$ $88 = \frac{1}{2}$ $(10 + b_2) \times 8$ $\therefore$ $22 = 10 + b_2$

$\therefore$ $b_2 = 12$ cm. (The req.)

[b] $\because$ $\overline{CM}$ is a median in Δ CDE

$\therefore$ The area of Δ CMD = The area of Δ CME

, $\because$ the area of Δ AMB = The area of Δ CME

$\therefore$ The area of Δ AMB = The area of Δ CMD

Adding the area of Δ AMD to both sides

$\therefore$ The area of Δ ABD = The area of Δ ACD and they have a common base $\overline{AD}$ and on one side of it.

$\therefore$ $\overline{AD} // \overline{BC}$ (Q.E.D.)

9 Ismailia

1

[1] (b) [2] (a) [3] (b) [4] (a) [5] (c)

2

[1] bisect each other [2] 5

[3] AD , BC , 300 [4] angles.

3

[a] $\because$ The area of Δ ABE = The area of Δ ACD

by subtracting the area of Δ ADE from both sides

$\therefore$ The area of Δ DBE = The area of Δ ECD

and thay have a common base $\overline{DE}$ and on one side of it

$\therefore$ $\overline{DE} // \overline{CB}$ (Q.E.D.)

[b] In ΔABC : $\because m(\angle B) = 90°$

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$

$\therefore AC = 25$ cm.

, In ΔACD : $\because (AC)^2 = 625$

, $(AD)^2 + (CD)^2 = (15)^2 + (20)^2 = 625$

$\therefore (AC)^2 = (AD)^2 + (CD)^2$

$\therefore m(\angle ADC) = 90°$ (First req.)

, $\because \overline{DE} \perp \overline{AC}$

$\therefore DE = \frac{AD \times CD}{AC} = \frac{15 \times 20}{25} = 12$ cm. (Second req.)

4

[a] In ΔABC : $\because (AC)^2 = (5)^2 = 25$

, $(AB)^2 + (BC)^2 = (3)^2 + (4)^2 = 25$

$\therefore (AC)^2 = (AB)^2 + (BC)^2$

$\therefore \Delta ABC$ is a right-angled triangle. (The req.)

[b] $\because$ The perimeter of the square ABCD $= 4\ell$

$\therefore 24 = 4\ell \quad \therefore \ell = 6$ cm.

$\therefore$ The area of $\Delta ABC = \frac{1}{2}$ BC $\times$ AB

$= \frac{1}{2} \times 6 \times 6 = 18$ cm^2

$\because \overline{AE}$ is a median in ΔABC

$\therefore$ The area of $\Delta AEC = \frac{1}{2}$ the area of ΔABC

$= \frac{1}{2} \times 18 = 9$ cm^2

(The req.)

5

[a] In $\Delta\Delta$ ABE , CDE :

$\because \overline{AB} // \overline{DC}$, $\overleftrightarrow{AC}$ is a transversal.

$\therefore m(\angle A) = m(\angle C)$ (alternate angles)

, $\because \overline{AB} // \overline{DC}$, $\overleftrightarrow{BD}$ is a transversal.

$\therefore m(\angle B) = m(\angle D)$ (alternate angles)

, $\because m(\angle AEB) = m(\angle CED)$ (V.O.A.)

$\therefore \Delta ABE \sim \Delta CDE$ (First req.)

, $\frac{BE}{DE} = \frac{AE}{CE} \quad \therefore \frac{2}{DE} = \frac{3}{6}$

$\therefore DE = \frac{2 \times 6}{3} = 4$ cm. (Second req.)

[b] $\because \overline{ME}$ is a median in ΔCMD

$\therefore$ The area of ΔMDE = The area of ΔMCE (1)

, $\because$ the area of ΔMAD = the area of ΔMBC (2)

Adding (1) and (2)

$\therefore$ The area of the figure ADEM = The area of the figure BCEM (Q.E.D.)

10 Damietta

1

1 (d) 2 (a) 3 (a) 4 (b) 5 (c)

2

1 135° 2 similar

3 the same point 4 30

3

[a] $\because$ The area of ΔAMB = The area of ΔCMD

Adding the area of ΔBCM to both sides.

$\therefore$ The area of ΔABC = The area of ΔDCB

and they have a common base $\overline{BC}$ and on one side of it.

$\therefore \overline{AD} // \overline{BC}$ (Q.E.D.)

[b] In ΔABC : $\because (BC)^2 = (7)^2 = 49$

, $(AB)^2 + (CA)^2 = (4)^2 + (5)^2 = 41$

$\therefore (BC)^2 > (AB)^2 + (CA)^2$

$\therefore \Delta ABC$ is an obtuse-angled triangle. (The req.)

4

[a] In $\Delta\Delta$ AFD , CFB :

$\because \overline{AD} // \overline{BC}$, $\overleftrightarrow{AC}$ is a transversal.

$\therefore m(\angle A) = m(\angle C)$ (alternate angles)

, $\because \overline{AD} // \overline{BC}$, $\overleftrightarrow{BD}$ is a transversal.

$\therefore m(\angle D) = m(\angle B)$ (alternate angles)

, $\because m(\angle AFD) = m(\angle BFC)$ (V.O.A.)

$\therefore \Delta AFD \sim \Delta CFB$ (First req.)

, $\frac{AF}{CF} = \frac{AD}{CB}$ $\therefore \frac{3}{CF} = \frac{4}{8}$

$\therefore CF = \frac{3 \times 8}{4} = 6$ cm. (Second req.)

[b] The area of $\square ABCD = 18 \times 10 = 180$ cm^2. (First req.)

, $\because$ the area of $\square ABCD = DY \times AB$

$\therefore 180 = DY \times 12$

$\therefore DY = \frac{180}{12} = 15$ cm. (Second req.)

5

[a] $\because \Delta BCE$, $\square ABCD$ have the common base $\overline{BC}$, $E \in \overline{AD}$

$\therefore$ The area of $\Delta EBC = \frac{1}{2}$ The area of $\square ABCD$

$= \frac{1}{2} \times 40 = 20$ cm^2.

, $\because \overline{BF}$ is a median of ΔBEC

$\therefore$ The area of $\Delta BEF = \frac{1}{2}$ The area of the ΔEBC

$= \frac{1}{2} \times 20 = 10$ cm^2. (The req.)

[b] In ΔABC :

$\because m(\angle BAC) = 90°$

$\therefore (BC)^2 = (AB)^2 + (AC)^2 = (20)^2 + (15)^2 = 625$

$\therefore BC = 25$ cm. (First req.)

, $\because \overline{AD} \perp \overline{BC}$

$\therefore AD = \frac{AB \times AC}{BC} = \frac{20 \times 15}{25} = 12$ cm. (Second req.)

11 El-Fayoum

1

[1] B [2] 10° [3] 60 [4] OM

2

[1] (b) [2] (d) [3] (a) [4] (d) [5] (b)

3

[a] $\because$ The two diagonals of the parallelogram bisect each other

$\therefore AM = \frac{1}{2} AC = 10$ cm.

, $BM = \frac{1}{2} BD = 6$ cm.

In ΔABM : $\because m(\angle ABM) = 90°$

$\therefore (AB)^2 = (AM)^2 - (BM)^2 = (10)^2 - (6)^2 = 64$

$\therefore AB = 8$ cm.

$\therefore$ The area of the parallelogram ABCD

$= AB \times BD = 8 \times 12 = 96$ cm^2. (The req.)

[b] In ΔCLD : $\because m(\angle CLD) = 90°$

$\therefore$ The area of $\Delta CLD = \frac{1}{2} \times DL \times CL$

$= \frac{1}{2} \times 6 \times 10 = 30$ cm^2.

, $\because$ the area of the parallelogram ABCD

$= 2 \times$ The area of ΔCLD

(They have the common base $\overline{CD}$ and betwen two parallel striaght lines $\overleftrightarrow{AB}$, $\overleftrightarrow{CD}$)

$\therefore$ The area of the parallelogram ABCD

$= 2 \times 30 = 60$ cm^2. (The req.)

4

[a] $\because \Delta\Delta CDE$, BDE have the same base $\overline{DE}$

, $\overline{DE} // \overline{BC}$

$\therefore$ The area of $\Delta CDE =$ The area of ΔBDE subtracting the area of ΔDOE from both sides.

$\therefore$ The area of $\Delta EOC =$ The area of ΔDOB (1)

, $\because \overline{CE}$ is a median in ΔOCH

$\therefore$ The area of $\Delta EOC =$ The area of ΔHEC (2)

From (1) and (2) :

$\therefore$ The area of $\Delta HEC =$ The area of ΔDOB (Q.E.D.)

[b] In $\Delta\Delta ADE$, ACB :

$\because m(\angle ADE) = m(\angle C)$

, $\angle A$ is a common angle.

$\therefore m(\angle AED) = m(\angle B)$

$\therefore \Delta ADE \sim \Delta ACB$ (First req.)

, $\frac{AD}{AC} = \frac{AE}{AB}$

$\therefore \frac{3}{AC} = \frac{4.5}{9}$ $\therefore AC = \frac{3 \times 9}{4.5} = 6$

$\therefore CE = AC - AE = 6 - 4.5 = 1.5$ cm. (Second req.)

5

[a] In Δ BCD : $\because (CD)^2 = (10)^2 = 100$

$\therefore (BC)^2 + (BD)^2 = (6)^2 + (8)^2 = 100$

$\therefore (CD)^2 = (BC)^2 + (BD)^2$

$\therefore$ m ($\angle$ CBD) = 90°

$\because \overline{BE} \perp \overline{DC}$

$\therefore BE = \frac{BC \times BD}{DC} = \frac{6 \times 8}{10} = 4.8$ cm. (First req.)

$\therefore (BC)^2 = CE \times CD$

$\therefore (6)^2 = CE \times 10$

$\therefore CE = \frac{36}{10} = 3.6$ cm. (Second req.)

[b] Construction : Draw $\overline{AC}$

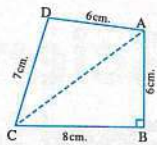
Proof : In Δ ABC :

$\because$ m ($\angle$ B) = 90°

$\therefore (AC)^2 = (AB)^2 + (BC)^2$

$= (6)^2 + (8)^2 = 100$

$\therefore AC = 10$ cm.



In Δ ACD : $\because (AC)^2 = 100$

$\therefore (AD)^2 + (CD)^2 = (6)^2 + (7)^2 = 85$

$\therefore (AC)^2 > (AD)^2 + (CD)^2$

$\therefore \Delta$ ADC is an obtuse-angled triangle (Q.E.D.)

12 Red Sea

1

1 (c) 2 (b) 3 (c) 4 (a) 5 (d)

2

1 18 2 120° 3 40 cm^2 4 13 cm.

3

[a] $\because \overline{AB}$ is the projection of $\overline{CB}$ on $\overrightarrow{AB}$

In Δ ABC : $\because$ m ($\angle$ BAC) = 90°

$\therefore \overline{AD} \perp \overline{BC}$

$\therefore (AB)^2 = BD \times BC = 9 \times 25 = 225$

$\therefore AB = 15$ cm. (First req.)

$\therefore$ the projection of $\overline{AD}$ on $\overrightarrow{BC}$ is the point D (Second req.)

$\therefore (AD)^2 = DB \times DC = 9 \times 16 = 144$

$\therefore AD = 12$ cm. (Third req.)

[b] The area of trapezium = $\frac{1}{2}(5 + 9) \times 4 = 28$ cm.^{2} (The req.)

4

[a] In $\Delta\Delta$ ADE , ABC :

$\because$ m ($\angle$ ADE) = m ($\angle$ B)

$\therefore \angle$ A is a common angle.

$\therefore$ m ($\angle$ AED) = m ($\angle$ C)

$\therefore \Delta$ ADE ~ Δ ABC (First req.)

$\therefore \frac{AD}{AB} = \frac{AE}{AC}$

$\therefore \frac{7}{14} = \frac{6}{AC}$ $\therefore AC = \frac{6 \times 14}{7} = 12$ cm.

$\therefore DC = AC - AD = 12 - 7 = 5$ cm. (Second req.)

[b] $\because \overleftrightarrow{AB} // \overleftrightarrow{DE}$, $\because \overline{AD} // \overline{EB}$

$\therefore$ ABED is a parallelogram

$\therefore$ the rectangle XDEY and the parallelogram ABED have a common base $\overline{DE}$

$\because \overline{AY} // \overline{DE}$

$\therefore$ The area of $\square$ ABED = the area of the rectangle XDEY

$\because$ the area of the rectangle XDEY = $10 \times 5 = 50$ cm.^{2}

$\therefore$ The area of $\square$ ABED = 50 cm.^{2} (First req.)

5

[a] In Δ ABC : $\because$ m ($\angle$ B) = 90°

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$

In Δ ADC : $\because (AC)^2 = 625$

$\therefore (AD)^2 + (CD)^2 = (15)^2 + (20)^2 = 625$

$\therefore (AC)^2 = (AD)^2 + (CD)^2$

$\therefore$ m ($\angle$ D) = 90° (Q.E.D.

[b] $\because \Delta\Delta$ ABC , DBC have a common base $\overline{BC}$

$\therefore \overline{AD} // \overline{BC}$

$\therefore$ The area of Δ ABC = The area of Δ DBC (1)

$\because \overline{ME}$ is a median in Δ MBC

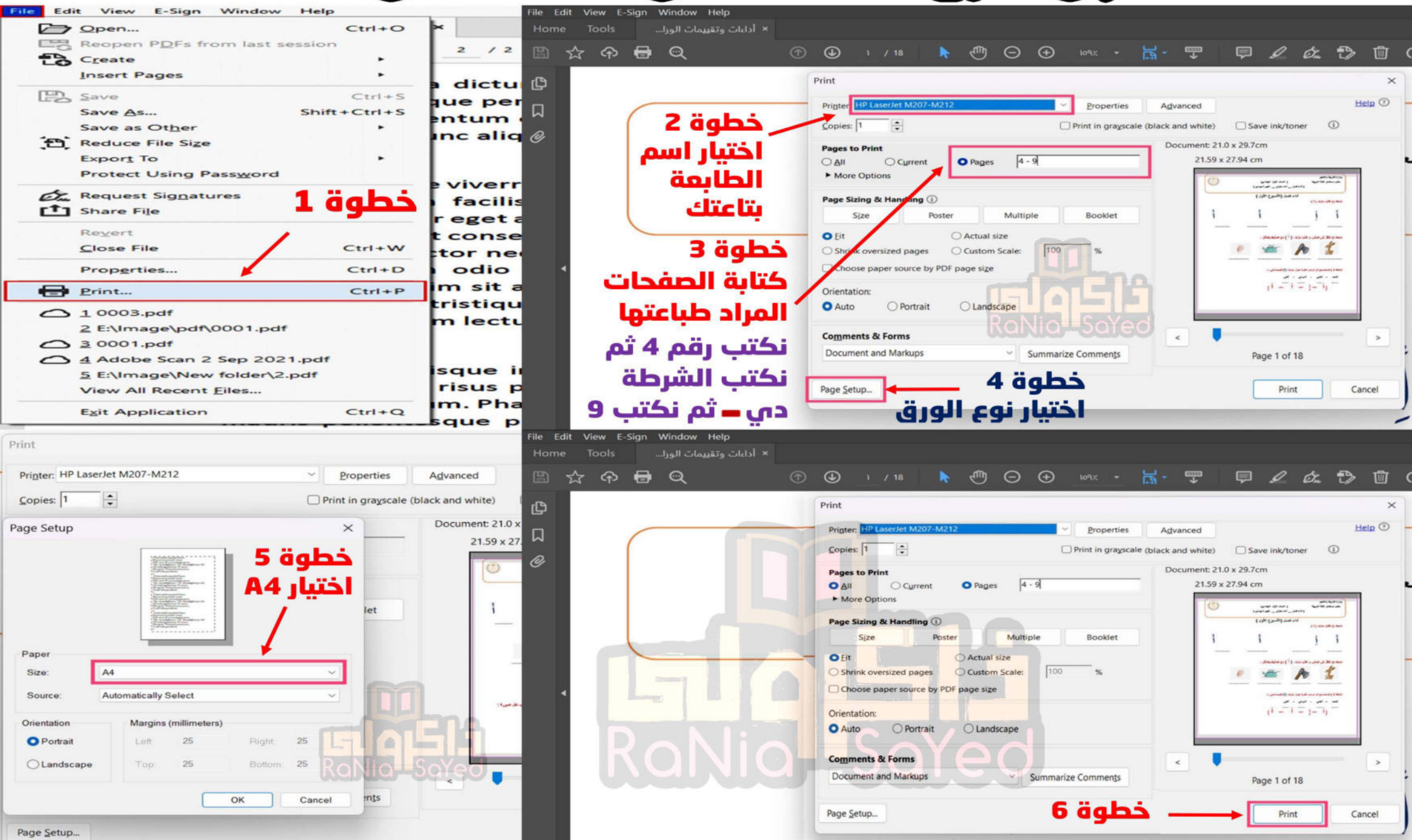
$\therefore$ The area of Δ CME = The area of Δ BME (2)

Subtracting (2) from (1) :

$\therefore$ The area of the figure ABEM = The area of the figure DCEM (Q.E.D.)

كيفية طباعة صفحات معينة من ملف معين

مثلا ازاى نطبع الصفحات من صفحة 4 الى صفحة 9



امتحانات رقم (2)

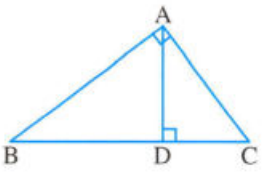
الترم الثانى

Model 1

Answer the following questions :

1 **Complete the following :**

1 **In the opposite figure :**



AB × ..... = BC × AD

2 In Δ ABC , if $(AC)^2 + (BC)^2 = (AB)^2$, then m (∠ .....) = 90°

3 If the point A ∈ the line L , then the projection of the point A on the line L is .....

4 The area of the circle of diameter length 14 cm. is ..... cm^2 $\left(\pi = \frac{22}{7}\right)$

5 A trapezium whose bases lengths are 8 cm. , 10 cm. and its height is 5 cm. , then its area equals ..... $cm.^2$

---

2 **Choose the correct answer :**

1 In Δ ABC , if $(AB)^2 > (BC)^2 + (AC)^2$, then ∠ C is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

2 A rhombus whose diagonals lengths are 6 cm. , 10 cm. has area ..... cm^2

(a) 60 (b) 30 (c) 15 (d) 10

3 The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters is .....

(a) 2 : 5 (b) 5 : 3 (c) 3 : 5 (d) 1 : 2

4 If the area of a trapezium is 100 cm^2 and its height is 5 cm. , then the length of its middle base equals ..... cm.

(a) 20 (b) 30 (c) 40 (d) 50

5 ABCD is a parallellogram in which m (∠ A) = 70° , then m (∠ B) = ...°

(a) 70 (b) 110 (c) 180 (d) 360

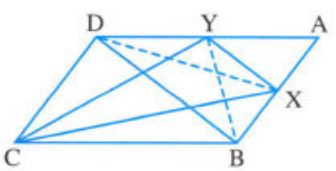
6 The measure of each angle of the regular pentagon is .....°

(a) 90 (b) 108 (c) 120 (d) 540

---

3 **[a]** The side lengths of one of two similar triangles are 3 cm. , 4 cm. , 5 cm. and the perimeter of the other triangle is 36 cm. Find the side lengths of the other triangle.

[b] **In the opposite figure :**



ABCD is a parallelogram , X ∈ $\overline{AB}$, Y ∈ $\overline{AD}$ such that : The area of Δ CBX = the area of Δ CYD

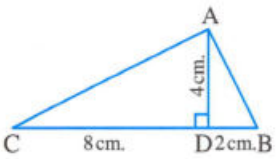
Prove that : $\overline{XY}$ // $\overline{BD}$

4 **[a] In the opposite figure :**

ABC is a triangle in which : BD = 2 cm.

, CD = 8 cm. , AD = 4 cm. , $\overline{AD} \perp \overline{BC}$

Prove that : m (∠ BAC) = 90°



[b] ABCD is a parallelogram in which : AB = 18 cm. and BC = 12 cm.

We draw $\overline{DE} \perp \overline{BC}$, $\overline{DO} \perp \overline{AB}$, DE = 15 cm.

Calculate the area of the parallelogram ABCD and find the length of $\overline{DO}$

---

5 **[a]** ABC is a triangle in which m (∠ A) = 50° , m (∠ B) = 60° ,

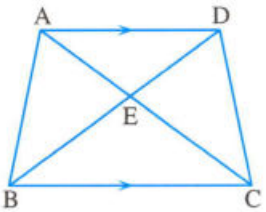
Arrange the lengths of the sides of the triangle in a descending order.

[b] In the opposite figure :

ABCD is a quadrilateral in which

$\overline{AD} // \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{E\}$

Prove that : The area of Δ ABE = the area of Δ DCE



Model 2

Answer the following questions :

1 **Complete the following :**

1 The two polygons are similar if their corresponding sides are ..... and their corresponding angles are .....

2 The area of a rhombus is 24 $cm.^2$, the length of one of its diagonals is 8 cm. , then the length of the other diagonal is .....

3 In Δ ABC , if $(AB)^2 = (AC)^2 - (BC)^2$, then Δ ABC is right-angled at .....

4 A triangle whose side lengths are 6 cm. , 8 cm. and 11 cm. , then its type according to its angles is .....

5 The area of a triangle is equal to half of the area of a parallelogram if they have a common .....

---

2 **Choose the correct answer :**

1 A trapezium whose bases lengths are 6 cm. , 8 cm. , then the length of its middle base equals ..... cm.

(a) 48 (b) 24 (c) 14 (d) 7

2 If two polygons are similar and the ratio between the lengths of two corresponding sides is 1 : 3 and the perimeter of the smaller polygon is 15 cm. , then the perimeter of the greater polygon is ..... cm.

(a) 30 (b) 45 (c) 60 (d) 75

3 If the area of the triangle is 24 cm.^{2} and its height is 8 cm. , then the length of the corresponding base is ..... cm.

(a) 16 (b) 6 (c) 3 (d) 12

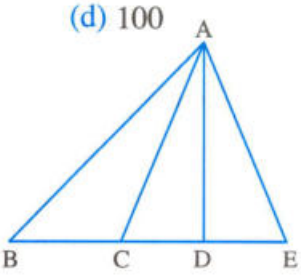
4 ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$, then the projection of $\overline{BD}$ on $\overleftrightarrow{AC}$ is the point .....

(a) A (b) B (c) C (d) D

5 A square of perimeter 20 cm. , then its area equals ..... cm^2

(a) 20 (b) 25 (c) 50 (d) 100

6 The number of the triangles in the opposite figure equals .....



(a) 3 (b) 4

(c) 5 (d) 6

---

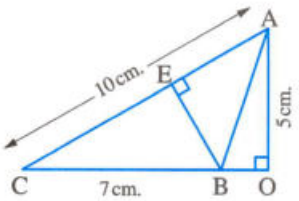
3 In the opposite figure :

$\overline{AO} \perp \overleftrightarrow{CB}$, $\overline{BE} \perp \overline{AC}$

, AC = 10 cm. , BC = 7 cm. and AO = 5 cm.

Find : 1 The length of $\overline{BE}$

2 The area of Δ ABC



---

4 [a] ABCD is a parallelogram in which : AB = 8 cm. , AC = 20 cm. and BD = 12 cm.

Prove that : m (∠ ABD) = 90° , then find the area of this parallelogram.

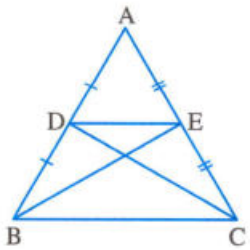
[b] In the opposite figure :

ABC is a triangle in which D is the midpoint of $\overline{AB}$, E is the midpoint of $\overline{AC}$

Prove that :

1 The area of the triangle DBC = the area of the triangle EBC

2 $\overline{DE} // \overline{BC}$



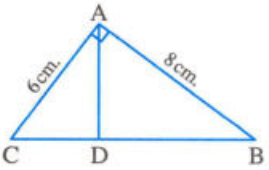
---

5 [a] In the opposite figure :

Δ DBA is similar to Δ ABC , m (∠ BAC) = 90°

Prove that : $\overline{AD} \perp \overline{BC}$ and if AB = 8 cm. , AC = 6 cm.

, find : the length of $\overline{BD}$



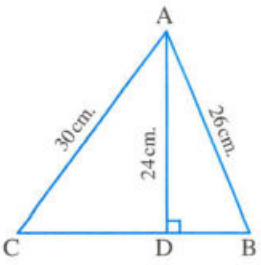
[b] In the opposite figure :

ABC is a triangle , $\overline{AD} \perp \overline{BC}$

If AD = 24 cm. , AB = 26 cm.

and AC = 30 cm.

, **find :** BC , then calculate the area of Δ ABC



Model for the merge students

Answer the following questions :

1 Choose the correct answer from those given :

1 The area of the parallelogram whose length of its base is 6 cm. and its corresponding height of this base is 4 cm. equals ..... cm^2.

(a) 12 (b) 20 (c) 24 (d) 48

2 The triangle whose lengths of its sides are 6 cm. , 8 cm. , 10 cm. is .....

(a) an acute-angled triangle. (b) a right-angled triangle.

(c) an obtuse-angled triangle. (d) otherwise.

3 The rhombus whose lengths of its diagonals are 6 cm. and 10 cm. , then its area = ... cm^2.

(a) 60 (b) 30 (c) 15 (d) 10

4 The trapezium of length of its middle base 8 cm. and surface area 56 cm^2. , then its height = ... cm.

(a) 32 (b) 24 (c) 448 (d) 7

5 All ..... are similar.

(a) squares (b) triangles (c) rectangles (d) parallelograms

2 Complete each of the following :

1 The projection of a point on a straight line is .....

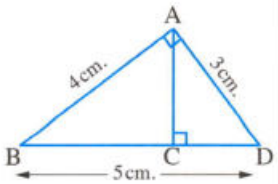
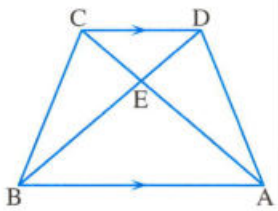
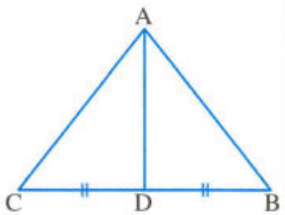
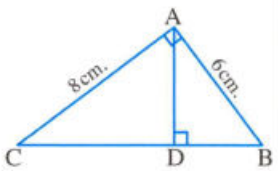
2 If the triangle ABC is obtuse-angled at B , then $(AC)^2$ ..... $(AB)^2 + (BC)^2$

3 The square whose length of its diagonal is 8 cm. , then its area = ... cm^2.

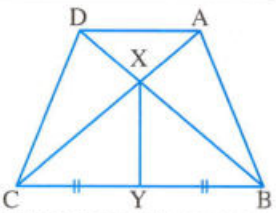
4 The two triangles have same base and the vertices opposite to this base are on a straight line parallel to the base .....

5 The area of triangle = $\frac{1}{2}$ × ..... × corresponding height.

3 **Join from the column (A) to the suitable one from the column (B) :**

Column (A)	Column (B)
1 **In the opposite figure :** AC = ... cm. 	• BEC
2 **In the opposite figure :** Area of Δ AED = area of Δ ..... 	• 2.4
3 **In the opposite figure :** Area of Δ ABD = area of Δ ..... 	• Congruent
4 If the ratio of enlargement between two similar triangles = 1 , then the two triangles are	• 3.6
5 **In the opposite figure :** The length of the projection of $\overline{AB}$ on $\overleftrightarrow{BC}$ = ... cm. 	• ACD

4 **In the opposite figure :**



Area of the figure ABYX = Area of the figure DCYX

Complete the proof to prove that : $\overline{AD}$ // $\overline{BC}$

Given : .....

R.T.P. : .....

Proof : ∵ $\overline{XY}$ is a median in Δ XBC

$\therefore$ Area of Δ ..... = area Δ ..... (1)

$\because$ area of the figure ABYX = area of the figure DCYX (2)

By subtracting (1) from (2) :

$\therefore$ Area of Δ ..... = area of Δ .....

By adding area of Δ ADX to both sides

$\therefore$ Area of Δ ..... = area of Δ .....

$\therefore \overline{AD} // \overline{BC}$ (Q.E.D.)

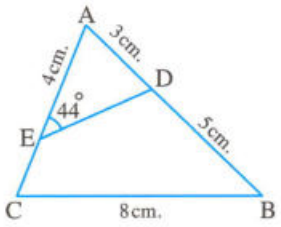
---

5 In the opposite figure :

$\Delta ABC \sim \Delta AED$

, m ($\angle$ AED) = 44° , AD = 3 cm. , EA = 4 cm.

, DB = 5 cm. , BC = 8 cm.



Complete to find the length of each of : $\overline{ED}$ and $\overline{EC}$

Solution :

$\because \Delta ABC \sim \Delta AED$

$\therefore \frac{AB}{.....} = \frac{.....}{ED} = \frac{CA}{DA}$

$\therefore \frac{8}{.....} = \frac{.....}{ED} = \frac{CA}{3}$

$\therefore$ ED = ... cm. , AC = ... cm. , EC = ... cm. (The req.)

2024 Some Schools Examinations on Geometry

1 Cairo Governorate

El-Nozha Educational Zone
Futures Language Schools

Answer the following questions :

1 Choose the correct answer :

1 The length of the base of the triangle whose area is 60 cm^2 and its height is 10 cm. is .....

(a) 6 cm. (b) 12 cm. (c) 15 cm. (d) 50 cm.

2 ABC is a triangle in which : $(AB)^2 - (BC)^2 < (AC)^2$, then $\angle C$ is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

3 The length of the diagonal of the square whose area is 50 cm^2 is ..... cm.

(a) $5\sqrt{2}$ (b) 15 (c) 12.5 (d) 10

4 The length of the projection of a given line segment ..... the length of the original line segment.

(a) > (b) = (c) < (d) ≤

5 The area of the triangle is ..... the area of the parallelogram which have a common base and included between two parallel straight lines.

(a) 1 (b) 2 (c) $\frac{1}{2}$ (d) 3

6 The projection of the point (3 , 5) on y-axis is .....

(a) (3 , 0) (b) (0 , 0) (c) (0 , 5) (d) (5 , 3)

---

2 Complete each of the following :

1 The median of the triangle divides it into .....

2 The diagonals of the isosceles trapezium are .....

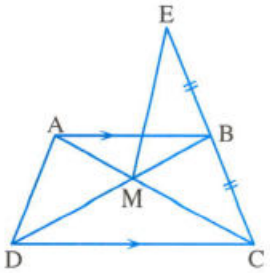
3 The area of the rhombus whose diagonal lengths are 8 cm. and 10 cm. is ..... cm^2

4 If two triangles are similar to a third one , then the two triangles are .....

5 Two parallelograms with a common base and between two parallel straight lines one of them carries the base are .....

6 If the ratio of enlargement of two similar polygons is equal to 1 , then the two polygons are .....

3 **[a] In the opposite figure :**



ABCD is a quadrilateral where

$\overline{AB} \,//\, \overline{CD}$ and EB = BC

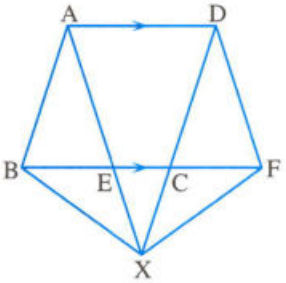
Prove that :

The area of Δ EBM = The area of Δ ADM

[b] The area of a trapezium is 180 cm^2 , its height is 12 cm. If the ratio between the lengths of the parallel bases is 3 : 2 , find the lengths of its parallel bases.

---

4 **[a] In the opposite figure :**



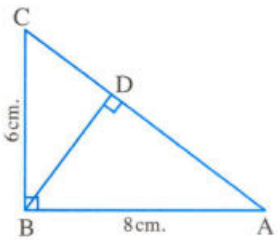
ABCD and ADFE

are two parallelograms

, $\overrightarrow{AE} \cap \overrightarrow{DC} = \{X\}$

Prove that : The area of Δ ABX = the area of Δ DFX

[b] In the opposite figure :



ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$

, AB = 8 cm. and BC = 6 cm.

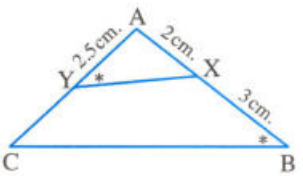
Find : 1 The length of each of $\overline{AC}$ and $\overline{BD}$

2 The length of the projection of $\overline{BC}$ on $\overleftrightarrow{AC}$

3 The length of the projection of $\overline{BA}$ on $\overleftrightarrow{AC}$

---

5 **[a] In the opposite figure :**



ABC is a triangle , where m (∠ B) = m (∠ AYX)

1 **Prove that :** Δ ABC ~ Δ AYX

2 If AX = 2 cm. , XB = 3 cm. and

AY = 2.5 cm. , **then find :** the length of $\overline{CY}$

[b] Determine the type of Δ ABC according to its angles where :

AB = 17 cm. , BC = 9 cm. and AC = 10 cm.

2 Cairo Governorate

Shoubra Educational Zone
Good Shepherd School

Answer the following questions :

1 Choose the correct answer :

1 In ΔABC , if $(AC)^2 = (BC)^2 - (AB)^2$, then $\angle A$ is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

2 A square whose diagonal length is 10 cm. , its area = ... cm^2

(a) 100 (b) 40 (c) 50 (d) 20

3 A rhombus is of area 60 cm^2 and the length of one of its diagonals equals 10 cm. , then the length of the other diagonal equals ..... cm.

(a) 4 (b) 8 (c) 10 (d) 12

4 The median of the triangle divides its surface into two triangles .....

(a) congruent. (b) equal in area. (c) isosceles. (d) right-angled

5 If the base length of a triangle is 8 cm. and its corresponding height is 3 cm. , then its area equals ..... cm^2

(a) 6 (b) 12 (c) 24 (d) 38

6 If two polygons are similar and the ratio between the lengths of two corresponding sides is 2 : 3 , then the ratio between their perimeters is .....

(a) 2 : 3 (b) 3 : 2 (c) 4 : 9 (d) 9 : 4

---

2 Complete each of the following :

1 If $\overline{AB} \perp \overline{BC}$, then the projection of $\overline{AC}$ on $\overleftrightarrow{BC}$ is .....

2 In ΔXYZ , if $(XZ)^2 + (YZ)^2 > (XY)^2$, then $\angle Z$ is .....

3 A trapezium whose bases are of lengths 6 cm. and 10 cm. and its height is 12 cm. , then its area equals ..... cm^2

4 The base angles of the isosceles trapezium are .....

5 If two adjacent sides of a parallelogram are of lengths 8 cm. and 10 cm. and its smaller height is 4 cm. , then its greater height is ..... cm.

6 The area of the rhombus whose perimeter is 52 cm. and the length of one of its diagonals is 10 cm. equals ..... cm^2

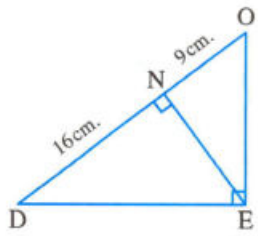
3 **[a] In the opposite figure :**

DEO is a right-angled triangle at E

, $\overline{EN} \perp \overline{DO}$, DN = 16 cm.

and ON = 9 cm.

Find : the lengths of $\overline{EN}$, $\overline{DE}$ and $\overline{EO}$

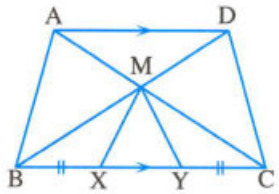


[b] In the opposite figure :

$\overline{AD} // \overline{BC}$, BX = CY

and $\overline{AC} \cap \overline{BD} = \{M\}$

Prove that : the area of ABXM = the area of DCYM



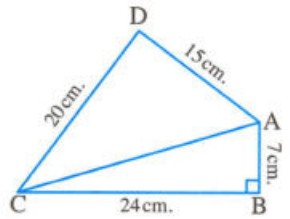
---

4 **[a] In the opposite figure :**

m (∠ B) = 90° , AB = 7 cm. , BC = 24 cm.

, CD = 20 cm. and DA = 15 cm.

Prove that : m (∠ D) = 90°



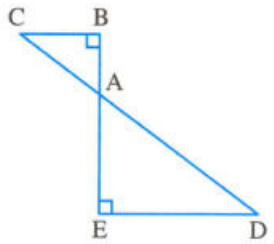
[b] In the opposite figure :

$\overline{BE} \cap \overline{DC} = \{A\}$ and

m (∠ B) = m (∠ E) = 90°

Prove that :

Δ ABC ~ Δ AED



---

5 **[a]** ABC is a triangle whose side lengths are 5 cm. , 7 cm. and 9 cm. Determine the type of the triangle ABC according to its angles.

[b] In the opposite figure :

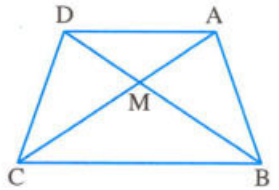
ABCD is a quadrilateral

, its diagonals intersect at M

and the area of Δ ABM = the area of Δ DCM

Prove that :

$\overline{AD} // \overline{BC}$



3 Giza Governorate

Official Schools
Math Inspection

Answer the following questions :

1 Choose the correct answer :

1 If two polygons are similar , then the corresponding ..... are equal in measure.

(a) sides (b) angles (c) rays (d) vertices

2 The sum of measures of the interior angles of a triangle equals .....

(a) 360° (b) 180° (c) 90° (d) supplementary

3 In ΔABC , if $(AB)^2 + (BC)^2 = (AC)^2$, then the type of the triangle according to its angles is .....

(a) right-angled. (b) acute-angled. (c) obtuse-angled. (d) straight angle.

4 The rhombus whose diagonal lengths are 6 cm. , 10 cm. has the area .....

(a) 60 cm^2 (b) 30 cm^2 (c) 15 cm^2 (d) 10 cm^2

5 The area of the square = $\frac{1}{2}$ of the product of the lengths of its .....

(a) sides. (b) diagonals. (c) heights. (d) medians.

6 The parallelogram and ..... with common base and between two parallel straight lines are equal in area.

(a) polygon (b) triangle (c) rectangle (d) trapezium

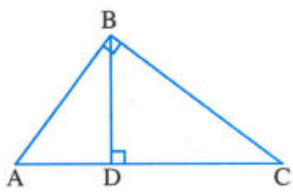
---

2 Complete :

1 **In the opposite figure :**

ABC is a right-angled triangle at B

, $\overline{BD} \perp \overline{AC}$, then $(BD)^2 = AD \times$ .....



2 The area of triangle is equal to half of the area of a parallelogram if they have a common ..... and lie between two parallel lines.

3 If $\overline{AB} \perp \overleftrightarrow{CD}$ and $B \in \overleftrightarrow{CD}$, then the length of the projection of $\overline{AB}$ on $\overleftrightarrow{CD}$ equals .....

4 The area of the trapezium , its height is 5 cm. and the lengths of its two parallel bases are 24 cm. and 12 cm. equals ..... cm^2

5 A square of side length 20 cm. , then its area equals ..... cm^2

6 If $\Delta ABC \sim \Delta XYZ$, then m ($\angle B$) = ...

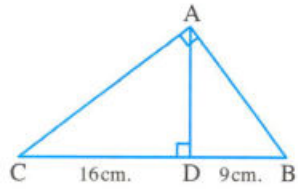
3 **[a] In the opposite figure :**

ABC is right-angled triangle at A

, $D \in \overline{CB}$, $\overline{AD} \perp \overline{CB}$

, CD = 16 cm. , DB = 9 cm.

Find : The length of each of $\overline{AC}$, $\overline{AD}$



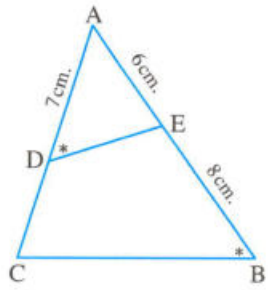
[b] In the opposite figure :

m (∠ ADE) = m (∠ B) , AD = 7 cm.

, AE = 6 cm. and EB = 8 cm.

1 **Prove that :** Δ ADE ~ Δ ABC

2 **Find :** the length of $\overline{AC}$

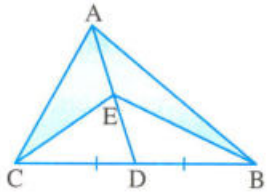


4 **[a] In the opposite figure :**

$\overline{AD}$ is a median of Δ ABC , $E \in \overline{AD}$

Prove that :

The area of Δ ACE = the area of Δ ABE



[b] In the opposite figure :

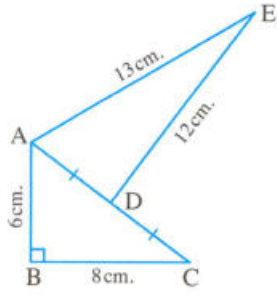
m (∠ B) = 90° , D is the midpoint of $\overline{AC}$

, AB = 6 cm. , BC = 8 cm.

, DE = 12 cm. , AE = 13 cm.

1 **Find :** the length of $\overline{AC}$

2 **Prove that :** m (∠ ADE) = 90°



5 **[a]** Find the height of a trapezium with area 450 cm^2 , its two parallel base lengths are 24 cm. and 12 cm.

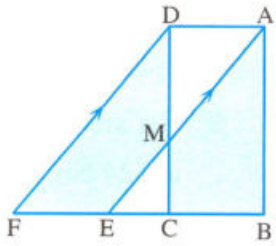
[b] In the opposite figure :

ABCD is a rectangle and AEFD

is a parallelogram where $\overline{AE} \,//\, \overline{DF}$

Prove that :

The area of the figure ABCM = the area of the figure DMEF



4 Giza Governorate — 6th of October Directorate of Education

Answer the following questions :

1 Choose the correct answer :

1 The diagonal lengths of a rhombus are 8 cm. , 10 cm. , then its area is ..... cm^2

(a) 80 (b) 40 (c) 20 (d) 50

2 The projection of a line segment on a straight line perpendicular to it is a .....

(a) ray. (b) point. (c) straight line. (d) line segment.

3 ABC is a triangle in which $(AB)^2 = (AC)^2 + (CB)^2$, then $\angle B$ is .....

(a) right. (b) obtuse. (c) acute. (d) straight.

4 If $\Delta ABC \sim \Delta XYZ$, then m ($\angle C$) = m ($\angle$ .....)

(a) X (b) Y (c) Z (d) B

5 The angle whose measure is 170° is .....

(a) acute. (b) obtuse. (c) right. (d) straight.

6 The lengths of the bases of a trapezium is 6 cm. and 10 cm. , then the length of its middle base is ..... cm.

(a) 16 (b) 15 (c) 9 (d) 8

2 Complete the following statements :

1 If two polygons are similar , then the lengths of their corresponding sides are .....

2 If two straight lines are intersecting , then each two vertically opposite angles are .....

3 A square whose area is 50 cm^2 , then its diagonal length is ..... cm.

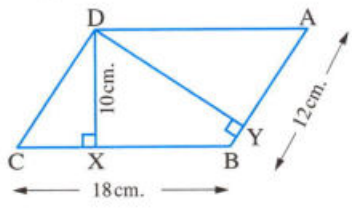
4 If ΔABC is a right-angled triangle at B , AB = 3 cm. , BC = 4 cm. , then AC = ... cm.

5 The number of axes of symmetry of an equilateral triangle is .....

6 If the point $A \in \overleftrightarrow{XY}$, then the projection of A on $\overleftrightarrow{XY}$ is .....

3 [a] In the opposite figure :

ABCD is a parallelogram , AB = 12 cm. , BC = 18 cm. , DX = 10 cm.



Find : 1 The area of the parallelogram ABCD

2 The length of $\overline{DY}$

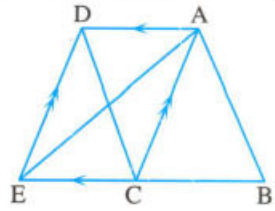
[b] Determine the type of the triangle ABC according to its angles if :

AB = 5 cm. , BC = 10 cm. , AC = 7 cm.

---

4 **[a] In the opposite figure :**

$\overline{AC} \parallel \overline{DE}$, $\overline{AD} \parallel \overline{EB}$, C is the midpoint of $\overline{BE}$



Prove that :

The area of the shape ABCD = the area of Δ ABE

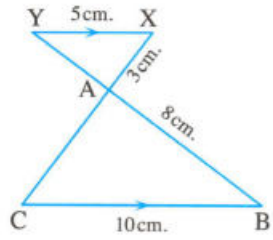
[b] A trapezium its area is 48 cm^2 and its height is 6 cm. Find the length of its middle base , and if the length of one of its two bases is 7 cm. , find the length of the other base.

---

5 **[a] In the opposite figure :**

$\overline{XY} \parallel \overline{BC}$, $\overline{XC} \cap \overline{BY} = \{A\}$

, XY = 5 cm. , BC = 10 cm. , AX = 3 cm. , AB = 8 cm.



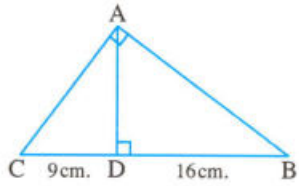
1 **Prove that :** Δ ABC ~ Δ AYX

2 **Find :** the lengths of $\overline{AC}$ and $\overline{AY}$

[b] In the opposite figure :

Δ ABC is a right-angled triangle at A , $\overline{AD} \perp \overline{BC}$

, BD = 16 cm. , DC = 9 cm.



Find : 1 The lengths of $\overline{AB}$, $\overline{AD}$ and $\overline{AC}$

2 The area of Δ ABC

5 Alexandria Governorate

El-Gomrok Educational Zone
Maths Supervision

Answer the following questions :

1 **Choose the correct answer :**

1 The triangle whose side lengths are 5 cm. , 12 cm. and 13 cm. , then the measure of its greatest angle equals .....

(a) 85° (b) 90° (c) 120° (d) 100°

2 The number of axes of symmetry of the isosceles triangle equals .....

(a) 1 (b) 2 (c) 3 (d) 4

3 If the ratio of enlargement between two similar polygons equals ..... , then the two polygons are congruent.

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) 1 (d) 2

4 ABCD is a parallelogram , its area is 40 cm^2 , then the area of Δ ABC = ... cm^2

(a) 10 (b) 15 (c) 20 (d) 60

5 The area of the rhombus whose diagonal lengths are 6 cm. and 8 cm. equals ..... cm^2

(a) 3 (b) 24 (c) 16 (d) 12

6 The rectangle whose dimensions are 6 cm. and 8 cm. , then its diagonal length equals ..... cm.

(a) 7 (b) 15 (c) 10 (d) 17

---

2 Complete each of the following :

1 The projection of the line segment perpendicular to a straight line on this line is .....

2 The median of the triangle divides its surface into two triangles .....

3 The two triangles are similar if their corresponding angles are .....

4 If m ($\angle$ ABC) = 60° , then m (reflex $\angle$ ABC) = ... °

5 If Δ ABC ~ Δ XYZ , m ($\angle$ B) = 50° , then m ($\angle$ .....) = 50°

6 The triangle ABC in which $(AC)^2 = (AB)^2 + (BC)^2$, then m ($\angle$ .....) = 90°

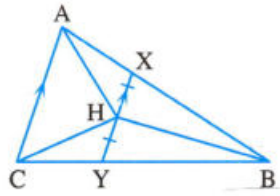
---

3 [a] In the opposite figure :

$\overline{XY}$ // $\overline{AC}$, H is the midpoint of $\overline{XY}$

Prove that :

The area of Δ AHB = the area of Δ CHB



[b] Show the type of the triangle ABC according to the measures of its angels , where AB = 7 cm. , BC = 8 cm. and AC = 9 cm.

---

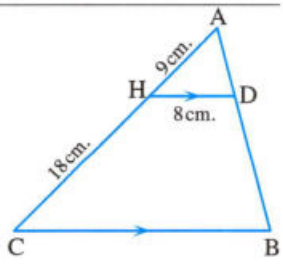
4 [a] In the opposite figure :

$\overline{DH}$ // $\overline{BC}$, DH = 8 cm.

, AH = 9 cm.

, HC = 18 cm.

Find : the length of $\overline{BC}$



[b] The area of a trapezium is 50 cm^2 and the lengths of its two parallel bases are 12 cm. , 8 cm. Find its height.

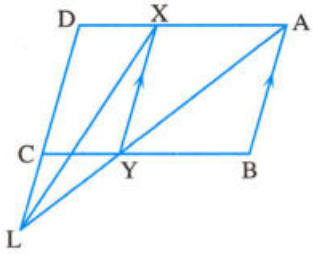
---

5 [a] In the opposite figure :

ABCD is a parallelogram in which $\overline{AB}$ // $\overline{XY}$

Prove that :

The area of Δ AXL = $\frac{1}{2}$ area of the parallelogram ABCD



[b] In the opposite figure :

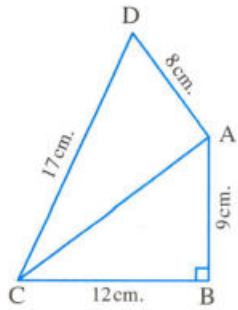
ABC is a right-angled triangle at B

, AB = 9 cm. , BC = 12 cm.

, DC = 17 cm.

, DA = 8 cm.

Prove that : m (∠ DAC) = 90°



6 El-Kalyoubia Governorate

Maths Supervision
Official Language School

Answer the following questions :

1 Choose the correct answer from those given :

1 Two similar triangles , the ratio between the lengths of two corresponding sides is 5 : 3 , then the ratio between their perimeters is .....

(a) 3 : 5 (b) 5 : 3 (c) 5 : 9 (d) 4 : 5

2 A square is of area 50 cm^2 , then the length of its diagonal equals ..... cm.

(a) 10 (b) 20 (c) 30 (d) 40

3 A parallelogram , the measure of one of its angles is 150° and its heights are 6 cm. and 5 cm. , then its area = ... cm^2

(a) 30 (b) 50 (c) 60 (d) 72

4 In Δ ABC , if $\frac{(AB)^2 + (BC)^2}{(AC)^2} < 1$, then ∠ B is .....

(a) acute. (b) right. (c) straight. (d) obtuse.

5 The length of the projection of a given line segment ..... the length of the original line segment.

(a) < (b) > (c) = (d) ≤

6 In Δ ABC , if AB = AC , m (∠ B) = 50° , then m (∠ A) = ...

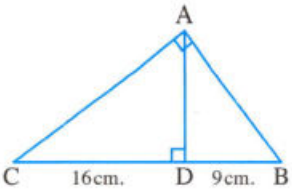
(a) 50° (b) 60° (c) 70° (d) 80°

2 Complete the following :

1 A trapezium , the lengths of its two parallel bases are 6 cm. , 8 cm. and its height is 10 cm. , then its area = ... cm^2

2 The angle of measure 70° supplements an angle of measure .....°

3 **In the opposite figure :**



ABC is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$, then the length of $\overline{AD}$ = ... cm.

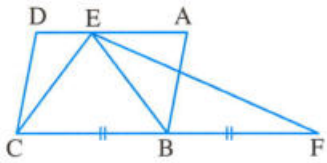
4 The median of a triangle divides it into two triangles .....

5 If $\Delta ABC \sim \Delta DEF$, $AB = \frac{1}{2} DE$, $DF = 8$ cm. , then $AC =$ .....

6 The projection of the point $(5 , -4)$ on X-axis is the point .....

---

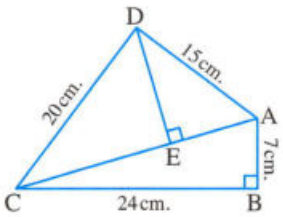
3 **[a] In the opposite figure :**



ABCD is a parallelogram , B is the midpoint of $\overline{CF}$

Prove that : The area of ΔEFC = the area of $\square ABCD$

[b] In the opposite figure :



ABC is a right-angled triangle at B

, $\overline{DE} \perp \overline{AC}$, $AB = 7$ cm.

, $BC = 24$ cm. , $DC = 20$ cm.

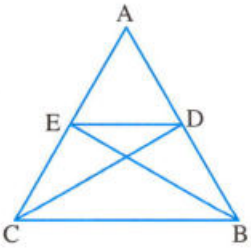
, $AD = 15$ cm.

Prove that : $m(\angle ADC) = 90°$

, then find the length of the projection of $\overline{AD}$ on $\overleftrightarrow{AC}$

---

4 **[a] In the opposite figure :**

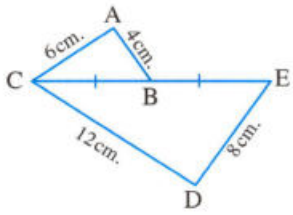


ABC is a triangle , $D \in \overline{AB}$, $E \in \overline{AC}$

, the area of ΔABE = the area of ΔACD

Prove that : $\overline{DE} // \overline{BC}$

[b] In the opposite figure :



B is the midpoint of $\overline{CE}$, $AB = 4$ cm.

, $AC = 6$ cm. , $DE = 8$ cm. and $CD = 12$ cm.

Prove that : 1 $\Delta ACB \sim \Delta DCE$

2 $\overrightarrow{CE}$ bisects $\angle ACD$

---

5 **[a]** A rhombus , the product of lengths of its diagonals is 72 cm^2 and its height is 9 cm.

Find : the perimeter of the rhombus.

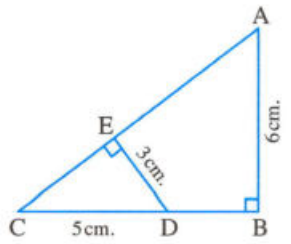
[b] In the opposite figure :

ABC is a right-angled triangle at B

, $\overline{DE} \perp \overline{AC}$

, $\Delta ABC \sim \Delta DEC$

Find : the lengths of $\overline{CE}$ and $\overline{AC}$



7 El-Sharkia Governorate — East of Zagazig Math Inspection

Answer the following questions :

1 Choose the correct answer :

1 The projection of a point on a given straight line is .....

(a) a point. (b) a line segment. (c) a ray. (d) a straight line.

2 The lengths of two adjacent sides of a parallelogram are 8 cm. and 5 cm. and the smaller height is 4 cm. , then its area equals ..... cm^2

(a) 17 (b) 32 (c) 20 (d) 52

3 All ..... are similar.

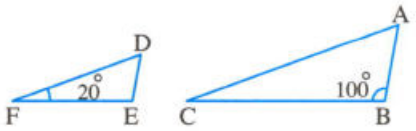
(a) triangles (b) pentagons (c) squares (d) rectangles

4 **In the opposite figure :**

If $\Delta ABC \sim \Delta DEF$, then m ($\angle A$) = ...

(a) 20° (b) 60°

(c) 80° (d) 100°



5 The rhombus whose diagonal lengths are 6 cm. , 10 cm. has an area ..... cm^2

(a) 60 (b) 30 (c) 15 (d) 10

6 ABC is a triangle in which : $(BC)^2 = (AB)^2 + (AC)^2$, m ($\angle B$) = 40°

, then m ($\angle C$) = ...

(a) 40° (b) 50° (c) 90° (d) 140°

2 Complete :

1 The two triangles are similar if the corresponding ..... are proportional.

2 If $\overline{AB} \perp \overline{BC}$, then the projection of $\overline{AB}$ on $\overleftrightarrow{BC}$ is .....

3 The base angles of the isosceles trapezium are .....

4 The triangle whose side lengths are 6 cm. , 8 cm. , 11 cm. , then its type according to its angles is .....

5 If two polygons are similar and the ratio between the lengths of two corresponding sides is 3 : 4 , then the ratio between their perimeters is .....

6 The median of a triangle divides its surface into two triangles .....

---

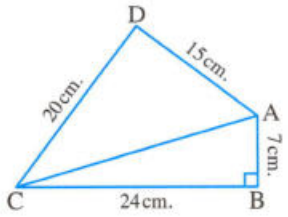
3 **[a] In the opposite figure :**

ABCD is a quadrilateral in which : m (∠ B) = 90°

, AB = 7 cm. , BC = 24 cm. , CD = 20 cm.

and DA = 15 cm.

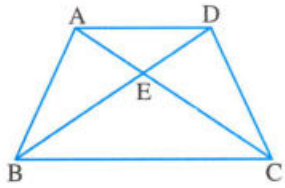
Prove that : m (∠ D) = 90°



[b] In the opposite figure :

The area of Δ AEB = the area of Δ DEC

Prove that : $\overline{AD}$ // $\overline{BC}$



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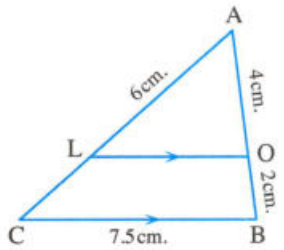
4 **[a] In the opposite figure :**

ABC is a triangle , $\overline{BC}$ // $\overline{OL}$

, AO = 4 cm. , BO = 2 cm. , AL = 6 cm. , BC = 7.5 cm.

1 **Prove that :** Δ ABC is similar to Δ AOL

2 **Find :** The lengths of $\overline{LC}$ and $\overline{OL}$

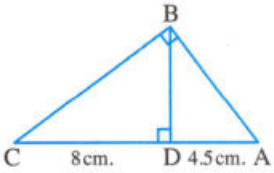


[b] In the opposite figure :

Δ ABC is right-angled at B and $\overline{BD} \perp \overline{AC}$

, AD = 4.5 cm. and DC = 8 cm.

Find : The length of each of $\overline{AB}$, $\overline{BC}$ and $\overline{BD}$



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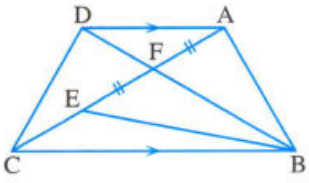
5 **[a] In the opposite figure :**

$\overline{AD}$ // $\overline{BC}$, F ∈ $\overline{AC}$ and E ∈ $\overline{AC}$

such that : AF = FE

Prove that : The area of Δ BFE = the area of Δ DFC



[b] A trapezium of lengths of two parallel bases 6 cm. and 4 cm.

Find its area if its height is 5 cm.

8 El-Dakahlia Governorate — Maths Supervision

Answer the following questions : ***(Calculator is permitted)***

1 Choose the correct answer from those given :

1 If the area of a triangle is 30 cm^2 , its height is 5 cm. , then its corresponding base length is ..... cm.

(a) 6 (b) 12 (c) 18 (d) 5

2 The area of the square whose diagonal length is 12 cm. is ..... cm^2

(a) 3 (b) 144 (c) 72 (d) 9

3 The corresponding angles of two similar polygons are ..... in measure.

(a) equal (b) different (c) alternate (d) proportional

4 The rhombus whose diagonal lengths are 6 cm. , 8 cm. , then its area = ... cm^2

(a) 10 (b) 12 (c) 24 (d) 48

5 In a parallelogram , the lengths of two adjacent sides are 7 cm. , 9 cm. and the smaller height is 4 cm. , then its area is ..... cm^2

(a) 28 (b) 32 (c) 36 (d) 63

6 In ΔABC , if $(AB)^2 + (BC)^2 < (AC)^2$, then $\angle A$ is .....

(a) right. (b) acute. (c) obtuse. (d) straight.

2 Complete each of the following :

1 Two similar polygons to a third one are .....

2 ABCD is a parallelogram , $E \in \overline{CD}$, the area of $\Delta AEB = 20$ cm^2 , then the area of the parallelogram ABCD = ... cm^2

3 The isosceles triangle has ..... axes of symmetry.

4 Two triangles are similar if the lengths of their corresponding sides are .....

5 The median of a triangle divides it into two triangles .....

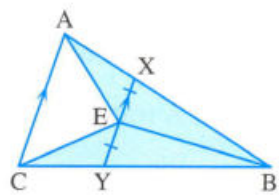
6 The type of the triangle whose side lengths are 3 cm. , 4 cm. and 5 cm. according to its angles is .....

3 [a] In the opposite figure :

$\overline{AC} // \overline{XY}$, E is the midpoint of $\overline{XY}$

Prove that :

The area of ΔABE = the area of ΔCBE

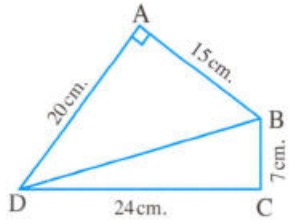


[b] In the opposite figure :

m (∠ A) = 90° , AB = 15 cm. , AD = 20 cm.

, BC = 7 cm. , CD = 24 cm.

Prove that : m (∠ C) = 90°



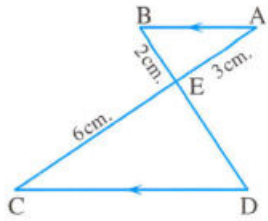
4 [a] In the opposite figure :

$\overline{AB} \parallel \overline{DC}$, $\overline{AC} \cap \overline{BD} = \{E\}$

, AE = 3 cm. , BE = 2 cm. , EC = 6 cm.

1 **Prove that :** Δ ABE ~ Δ CDE

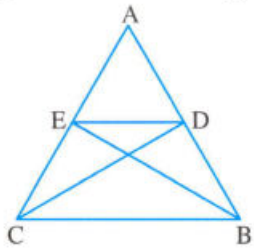
2 **Find :** the length of $\overline{DE}$



[b] In the opposite figure :

The area of Δ ABE = the area of Δ ACD

Prove that : $\overline{DE} \parallel \overline{BC}$

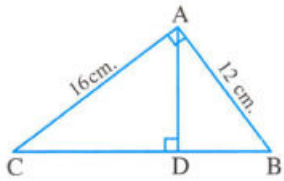


5 [a] In the opposite figure :

Δ ABC is right-angled at A , $\overline{AD} \perp \overline{BC}$

, AB = 12 cm. , AC = 16 cm.

Find : the lengths of $\overline{BC}$ and $\overline{AD}$



[b] Find the area of the trapezium with two parallel bases of lengths 10 cm. , 14 cm. and its height is 8 cm.

9 Ismailia Governorate

Directorate of Education
Maths Supervision

Answer the following questions :

1 Choose the correct answer :

1 In Δ ABC , if $(AC)^2 = (AB)^2 + (BC)^2$, then m (∠ B) = ...

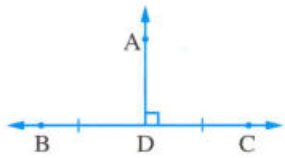
(a) 30° (b) 60° (c) 90° (d) 100°

2 **In the opposite figure :**

The length of the projection of $\overline{AD}$ on $\overleftrightarrow{BC}$ is .....

(a) 0 (b) 1

(c) 2 (d) 3



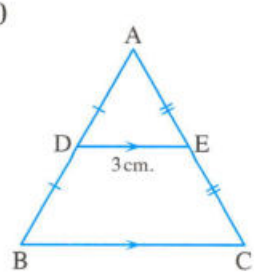
3 The area of the square whose diagonal length is 8 cm. is ..... cm^2.

(a) 25 (b) 30 (c) 32 (d) 40

4 **In the opposite figure :**

If DE = 3 cm. ,

then BC = ... cm.



(a) 1 (b) 5 (c) 6 (d) 7

5 The measures of base angles of an isosceles trapezium are .....

(a) equal. (b) complementary. (c) parallel. (d) supplementary.

6 The area of a parallelogram is 60 cm^2 and the length of one base is 12 cm. , then the corresponding height is ..... cm.

(a) 1 (b) 5 (c) 10 (d) 12

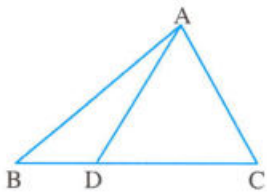
2 Complete :

1 The area of the triangle = $\frac{1}{2}$ × ..... × h

2 **In the opposite figure :**

If the area of Δ ADB = $\frac{1}{2}$ the area of Δ ADC

, then BD = ... DC



3 The two diagonals are perpendicular and equal in length in .....

4 If Δ XYZ ~ Δ ABC , m (∠ X) = 30° , m (∠ Y) = 90° , then m (∠ C) = ...°

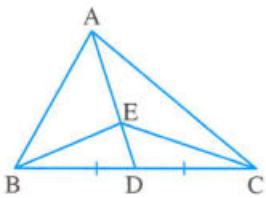
5 If the two triangles are similar and congruent , then the ratio between the lengths of two corresponding sides equals .....

6 If the area of a trapezium = 84 cm^2 , and the length of the middle base = 12 cm. , then its height = ... cm.

3 [a] In the opposite figure :

ABC is a triangle

, $\overline{AD}$ is a median , E ∈ $\overline{AD}$



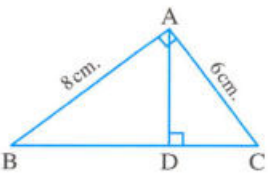
Prove that :

The area of Δ ABE = the area of Δ ACE

[b] In the opposite figure :

m (∠ BAC) = 90° , $\overline{AD} \perp \overline{CB}$

, AB = 8 cm. , AC = 6 cm. ,



Find by proof : the lengths of $\overline{AD}$, $\overline{CD}$ and $\overline{BD}$

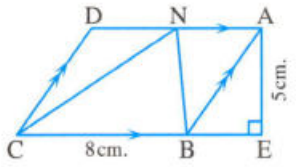
4 **[a]** Determine the type of the Δ ABC according to its angles if AB = 6 cm. , AC = 12 cm. , BC = 8 cm.

[b] In the opposite figure :

ABCD is a parallelogram , CB = 8 cm.

, AE = 5 cm. , $N \in \overline{DA}$, $E \in \overrightarrow{CB}$, $\overline{AE} \perp \overline{CE}$

Find by proof : the area of Δ NCB



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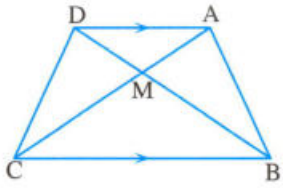
5 **[a] In the opposite figure :**

If $\overline{AD} // \overline{BC}$

, prove that :

the area of Δ AMB = the area of Δ DMC

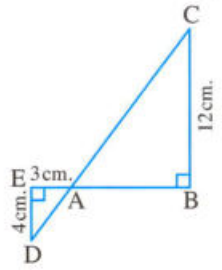


[b] In the opposite figure :

$\overline{BE} \cap \overline{DC} = \{A\}$, m (∠ B) = 90° , m (∠ E) = 90°

1 **Prove that :** Δ ABC ~ Δ AED

2 **Find :** the lengths of $\overline{AB}$, $\overline{AC}$



10 Damietta Governorate

New Damietta Zone
El-kafrawi Language School

Answer the following questions : ***(Calculator is allowed)***

1 **Choose the correct answer from those given :**

1 The area of a parallelogram is 30 cm^2 and its base length is 6 cm. , then its corresponding height is ..... cm.

(a) 15 (b) 10 (c) 5 (d) 90

2 The median of a triangle divides its surface into two triangles .....

(a) similar. (b) congruent. (c) equal in area. (d) equal in perimeter.

3 In Δ ABC , if $(AC)^2 < (AB)^2 + (BC)^2$, then the type of ∠ B is .....

(a) obtuse. (b) right. (c) straight. (d) acute.

4 The trapezium whose middle base length = 8 cm. and its height = 5 cm. , its area = ... cm^2

(a) 60 (b) 40 (c) 30 (d) 20

5 If $\overline{AB} // \overleftrightarrow{CD}$, then the length of the projection of $\overline{AB}$ on $\overleftrightarrow{CD}$ ..... the length of $\overline{AB}$

(a) > (b) < (c) = (d) otherwise.

6 The rhombus whose diagonal lengths are 10 cm. , 6 cm. , its area = ... cm^2

(a) 30 (b) 40 (c) 60 (d) 120

2 Complete the following :

1 A square its diagonal length = 10 cm. , then its area = ... cm^2

2 The two polygons are similar if their corresponding angles are ..... and their corresponding sides are .....

3 The area of a triangle is equal to half of the area of a parallelogram if they have a common base and .....

4 The area of the rectangle = ...

5 The number of axes of symmetry of an isosceles triangle equals .....

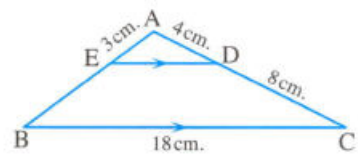
6 If $\overline{AB} \perp \overleftrightarrow{CD}$, then the length of the projection of $\overline{AB}$ on $\overleftrightarrow{CD}$ equals .....

3 [a] Find the height of the trapezium whose area is 70 cm^2 and the two base lengths are 12 cm. , 8 cm.

[b] In the opposite figure :

$\overline{ED} // \overline{BC}$, AD = 4 cm. , DC = 8 cm.

, EA = 3 cm. , BC = 18 cm.



1 **Prove that :** $\Delta AED \sim \Delta ABC$

2 **Find :** the length of $\overline{ED}$

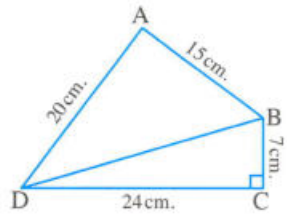
4 [a] Determine the type of the triangle ABC according to its angles where AB = 7 cm. , BC = 6 cm. , AC = 9 cm.

[b] In the opposite figure :

m ($\angle$ C) = 90° , AB = 15 cm.

, BC = 7 cm. , CD = 24 cm. , AD = 20 cm.

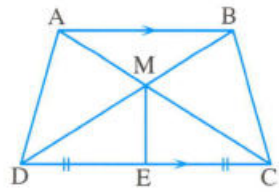
Prove that : m ($\angle$ A) = 90°



5 [a] **In the opposite figure :**

$\overline{AB} // \overline{CD}$, $\overline{AC} \cap \overline{BD} = \{M\}$

, E is the midpoint of $\overline{CD}$



Prove that :

The area of the figure ADEM = the area of the figure BCEM

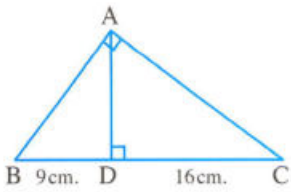
[b] In the opposite figure :

ABC is a triangle , m (∠ BAC) = 90°

, $\overline{AD} \perp \overline{BC}$, BD = 9 cm.

, DC = 16 cm.

Find : AD , AB , AC



11 Assiut Governorate

Administration of Distinguished & Governmental Language Schools

Answer the following questions : ***(Calculator is allowed)***

1 Choose the correct answer from those given :

1 A rhombus its two diagonals are of lengths 8 cm. and 6 cm. , its area equals ..... cm^2

(a) 14 (b) 20 (c) 24 (d) 48

2 If $\overline{AB} // \overline{XY}$, then the length of the projection of $\overline{AB}$ on $\overleftrightarrow{XY}$ ..... the length of $\overline{AB}$

(a) = (b) > (c) < (d) otherwise

3 The sum of measures of the interior angles of a triangle equals .....

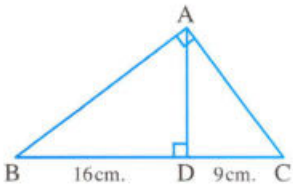
(a) 90° (b) 180° (c) 360° (d) 120°

4 **In the opposite figure :**

m (∠ BAC) = 90° , $\overline{AD} \perp \overline{BC}$

, DC = 9 cm. , DB = 16 cm.

, then AD = ... cm.



(a) 144 (b) 25 (c) 50 (d) 12

5 In Δ ABC , if $(AB)^2 > (BC)^2 + (AC)^2$, then ∠ C is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

6 All ..... are similar.

(a) squares (b) rectangles (c) triangles (d) parallelograms

2 Complete the following :

1 ABCD is a parallelogram in which m (∠ A) = 60° , then m (∠ B) = ...°

2 The two triangles are similar if their corresponding side lengths are .....

3 A square is of perimeter 16 cm. , then its area equals ..... cm^2

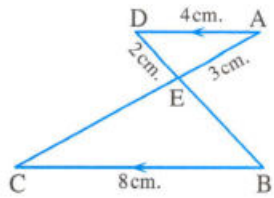
4 ABCD is a parallelogram , its area = 36 cm^2 , $E \in \overline{AD}$, then the area of Δ EBC equal ..... cm^2

5 If $\Delta ABC \sim \Delta XYZ$, $m(\angle A) = 70°$, $m(\angle Y) = 60°$, then $m(\angle Z) =$ ..... °

6 The median of a triangle divides it into two triangles ..... in area.

3 **[a] In the opposite figure :**

$\overline{AD} // \overline{BC}$, $\overline{AC} \cap \overline{DB} = \{E\}$, AD = 4 cm. , BC = 8 cm. , AE = 3 cm. and ED = 2 cm.



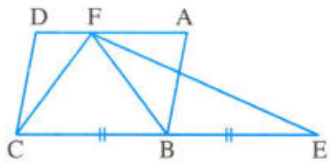
1 **Prove that :** $\Delta AED \sim \Delta CEB$

2 **Find :** the perimeter of ΔEBC

[b] Find the area of a trapezium if the lengths of its parallel bases are 5 cm. , 9 cm. and its height is 4 cm.

4 **[a] In the opposite figure :**

ABCD is a parallelogram , $E \in \overrightarrow{CB}$ where BC = BE

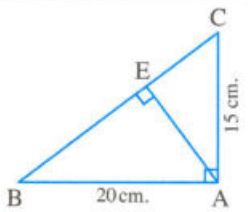


Prove that : the area of ΔFCE = the area of $\square ABCD$

[b] Determine the type of the triangle ABC according to its angles where AB = 7 cm. , BC = 6 cm. and AC = 9 cm.

5 **[a] In the opposite figure :**

ABC is a right-angled triangle at A , $\overline{AE} \perp \overline{BC}$, AB = 20 cm. , AC = 15 cm.

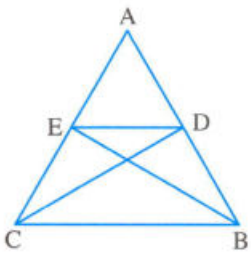


Find : 1 The length of the projection of $\overline{AB}$ on $\overleftrightarrow{BC}$

2 The length of $\overline{EC}$

[b] In the opposite figure :

If the area of ΔADC = the area of ΔAEB , **prove that :** $\overline{DE} // \overline{BC}$



12 South Sinai Governorate

The Educational Directorate
Tur Sinai Educational Zone

Answer the following questions :

1 **Choose the correct answer :**

1 The diagonals of the isosceles trapezium are .....

(a) congruent. (b) perpendicular. (c) parallel. (d) bisecting each other.

2 If the area of a triangle is 24 cm^2 and its height is 8 cm. , then its corresponding base length is ..... cm.

(a) 16 (b) 6 (c) 3 (d) 2

3 Δ ABC is a right-angled triangle at B , $\overline{BD} \perp \overline{AC}$ intersecting it at D , then the projection of $\overline{BD}$ on $\overleftrightarrow{AC}$ is .....

(a) A (b) B (c) C (d) D

4 A square whose perimeter is 20 cm. , then its area is ..... cm^2

(a) 20 (b) 25 (c) 50 (d) 100

5 If the ratio between the lengths of two corresponding sides in two similar polygons is 1 : 3 and the perimeter of the smaller polygon is 15 cm. , then the perimeter of the greater polygon is ..... cm.

(a) 30 (b) 45 (c) 60 (d) 75

6 A rhombus whose diagonal lengths are 6 cm. and 11 cm. , then its area is ..... cm^2

(a) 66 (b) 17 (c) 33 (d) 5

2 Complete the following :

1 The area of the triangle = ... × .....

2 The area of the parallelogram whose base length is 6 cm. and its corresponding height is 4 cm. equals ..... cm^2

3 The median of a triangle divides its surface into two triangles ..... in area.

4 The two polygons are similar if the corresponding sides are ..... and the corresponding angles are .....

5 In Δ ABC , if $(AC)^2 + (CB)^2 = (AB)^2$, then m ($\angle$ .....) = 90°

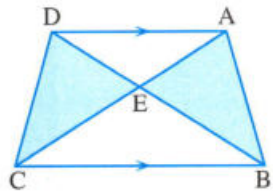
6 A trapezium whose two parallel bases are of lengths 8 cm. , 10 cm. and its height is 5 cm. , then its area is ..... cm^2

3 [a] In the opposite figure :

ABCD is a quadrilateral

, $\overline{AD} // \overline{BC}$, $\overline{AC} \cap \overline{BD} = \{E\}$

Prove that : the area of Δ ABE = the area of Δ DCE



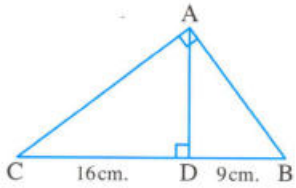
[b] Determine the type of Δ ABC according to its angles , where AB = 6 cm. , BC = 8 cm. and AC = 11 cm.

4 **[a] In the opposite figure :**

Δ ABC is a right-angled triangle at A , $\overline{AD} \perp \overline{BC}$

, BD = 9 cm. , CD = 16 cm.

Find : the length of $\overline{AC}$ and $\overline{AD}$



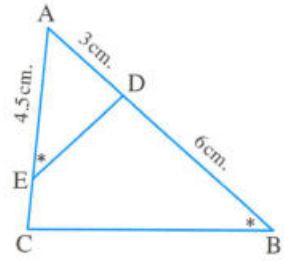
[b] In the opposite figure :

m ($\angle$ AED) = m ($\angle$ B) , AD = 3 cm.

, AE = 4.5 cm. , BD = 6 cm.

1 **Prove that :** Δ ADE ~ Δ ACB

2 **Find :** the length of $\overline{EC}$

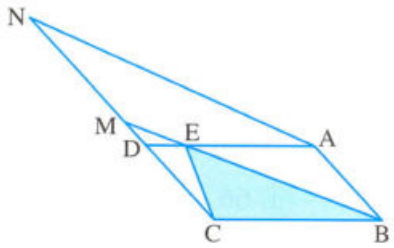


5 **[a] In the opposite figure :**

ABCD , ABMN are two parallelograms

Prove that :

The area of Δ EBC = $\frac{1}{2}$ the area of $\square$ ABMN

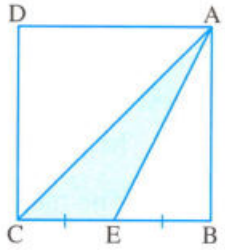


[b] In the opposite figure :

ABCD is a square , its perimeter is 24 cm.

, E is the midpoint of $\overline{BC}$

Find with proof : the area of Δ AEC



Answers of the schools examinations on Geometry

1 Cairo

1

1 (b) 2 (a) 3 (d) 4 (d) 5 (c) 6 (c)

2

1 two triangles equal in area.

2 equal in length 3 40

4 similar. 5 equal in area 6 congruent

3

[a] ∵ ΔΔ ABC , ABD have a common base $\overline{AB}$

, $\overline{AB} // \overline{CD}$

∴ The area of Δ ABC = the area of Δ ABD

Subtracting the area of Δ ABM from both sides

∴ The area of Δ MBC = the area of Δ ADM (1)

, ∵ $\overline{MB}$ is a median in Δ EMC

∴ The area of Δ EBM = the area of Δ MBC (2)

From (1) and (2) :

∴ The area of Δ EBM = the area of Δ ADM

(Q.E.D.)

[b] Let the lengths of the two parallel bases be $3X$ cm. and $2X$ cm.

∴ $\frac{1}{2}(3X + 2X) \times 12 = 180$

∴ $5X = 30$ ∴ $X = 6$

∴ The lengths of the two bases are :

18 cm. and 12 cm. (The req.)

4

[a] ∵ Δ ABX , ▱ ABCD have a common base $\overline{AB}$

, $\overline{AB} // \overline{XD}$

∴ The area of Δ ABX = $\frac{1}{2}$ the area of ▱ ABCD (1)

, ∵ Δ DFX , ▱ ADFE have a common base $\overline{DF}$

, $\overline{DF} // \overline{AX}$

∴ The area of Δ DFX = $\frac{1}{2}$ the area of ▱ ADFE (2)

, ∵ ▱ ABCD , ▱ ADFE have a common base $\overline{AD}$

, $\overline{AD} // \overline{BF}$

∴ The area of ▱ ABCD = the area of ▱ ADFE (3)

From (1) , (2) and (3) :

∴ The area of Δ ABX = the area of Δ DFX

(Q.E.D.)

[b] In Δ ABC : ∵ m (∠ B) = 90° , $\overline{BD} \perp \overline{AC}$

∴ $(AC)^2 = (AB)^2 + (BC)^2 = (8)^2 + (6)^2 = 100$

∴ AC = 10 cm.

, $BD = \frac{AB \times BC}{AC} = \frac{8 \times 6}{10} = 4.8$ cm. (First req.)

, ∵ $\overline{DC}$ is the projection of $\overline{BC}$ on $\overline{AC}$

∴ $(BC)^2 = CD \times AC$

∴ $(6)^2 = CD \times 10$

∴ $CD = \frac{36}{10} = 3.6$ cm. (Second req.)

, ∵ $\overline{DA}$ is the projection of $\overline{BA}$ on $\overrightarrow{AC}$

∴ DA = 10 − 3.6 = 6.4 cm. (Third req.)

5

[a] ∵ m (∠ B) = m (∠ AYX)

, ∠ A is a common angle

∴ m (∠ C) = m (∠ AXY)

∴ Δ ABC ~ Δ AYX (First req.)

∴ $\frac{AB}{AY} = \frac{AC}{AX}$ ∴ $\frac{5}{2.5} = \frac{AC}{2}$

∴ $AC = \frac{5 \times 2}{2.5} = 4$ cm.

∴ CY = 4 − 2.5 = 1.5 cm (Second req.)

[b] ∵ $(AB)^2 = (17)^2 = 289$

, $(BC)^2 + (AC)^2 = (9)^2 + (10)^2 = 181$

∴ $(AB)^2 > (BC)^2 + (AC)^2$

∴ Δ ABC is an obtuse-angled triangle. (The req.)

2 Cairo

1

1 (b) 2 (c) 3 (d) 4 (b) 5 (b) 6 (a)

2

1 $\overline{BC}$ 2 acute 3 96

4 congruent 5 5 6 120

3

[a] ∵ m (∠ DEO) = 90° , $\overline{EN} \perp \overline{OD}$

∴ $(EN)^2 = DN \times NO = 16 \times 9 = 144$

∴ EN = 12 cm.

, ∵ $(DE)^2 = DN \times DO = 16 \times 25 = 400$

$\therefore$ DE = 20 cm.

, $\because (EO)^2 = ON \times DO = 9 \times 25 = 225$

$\therefore$ EO = 15 cm. (The req.)

[b] $\because$ $\Delta\Delta$ ADB , ADC have a common base $\overline{AD}$

, $\overline{AD} \parallel \overline{BC}$

$\therefore$ The area of Δ ADB = the area of Δ ADC

Subtracting the area of Δ ADM from both sides

$\therefore$ The area of Δ AMB = the area of Δ DCM (1)

, $\because$ $\Delta\Delta$ BMX , CMY have a common vertex M

, BX = CY

$\therefore$ The area of Δ BMX = the area of Δ CMY (2)

Adding (1) and (2) :

$\therefore$ The area of ABXM = the area of DCYM (Q.E.D.)

4

[a] In Δ ABC : $\because$ m ($\angle$ B) = 90°

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$

In Δ ADC : $\because (AC)^2 = 625$

, $(AD)^2 + (CD)^2 = (15)^2 + (20)^2 = 625$

$\therefore (AC)^2 = (AD)^2 + (CD)^2$

$\therefore$ m ($\angle$ D) = 90° (Q.E.D.)

[b] $\because$ m ($\angle$ B) = m ($\angle$ E) = 90°

, m ($\angle$ BAC) = m ($\angle$ EAD) (V.O.A.)

$\therefore$ m ($\angle$ C) = m ($\angle$ D)

$\therefore$ Δ ABC ~ Δ AED (Q.E.D.)

5

[a] Let AB = 5 cm. , BC = 7 cm. , AC = 9 cm.

$\because (AC)^2 = (9)^2 = 81$

, $(AB)^2 + (BC)^2 = (5)^2 + (7)^2 = 74$

$\therefore (AC)^2 > (AB)^2 + (BC)^2$

$\therefore$ Δ ABC is an obtuse-angled triangle (The req.)

[b] $\because$ The area of Δ ABM = the area of Δ DCM

Adding the area of Δ ADM to both sides

$\therefore$ The area of Δ ADB = the area of Δ ADC

and they have a common base $\overline{AD}$ and on one side of it

$\therefore$ $\overline{AD} \parallel \overline{BC}$ (Q.E.D.)

3 Giza

1

1 (b) 2 (b) 3 (a) 4 (b) 5 (b) 6 (c)

2

1 CD	2 base	3 zero
4 90	5 400	6 m ($\angle$ Y)

3

[a] $\because$ m ($\angle$BAC) = 90° , $\overline{AD} \perp \overline{BC}$

$\therefore (AC)^2 = CD \times BC = 16 \times 25 = 400$

$\therefore$ AC = 20 cm.

, $(AD)^2 = CD \times BD = 16 \times 9 = 144$

$\therefore$ AD = 12 cm. (The req.)

[b] $\because$ m ($\angle$ ADE) = m ($\angle$ B)

, $\angle$ A is a common angle

$\therefore$ m ($\angle$ AED) = m ($\angle$ C)

$\therefore$ Δ ADE ~ Δ ABC (First req.)

$\therefore \frac{AD}{AB} = \frac{AE}{AC}$ $\therefore \frac{7}{14} = \frac{6}{AC}$

$\therefore AC = \frac{6 \times 14}{7} = 12$ cm. (Second req.)

4

[a] In Δ ABC : $\because$ $\overline{AD}$ is a median

$\therefore$ The area of Δ ACD = the area of Δ ABD (1)

In Δ EBC : $\because$ $\overline{ED}$ is a median

$\therefore$ The area of Δ ECD = the area of Δ EBD (2)

Subtracting (2) from (1) :

$\therefore$ The area of Δ ACE = the area of Δ ABE (Q.E.D.)

[b] In Δ ABC : $\because$ m ($\angle$ B) = 90°

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (6)^2 + (8)^2 = 100$

$\therefore$ AC = 10 cm. (First req.)

, $\because$ D is the midpoint of $\overline{AC}$

$\therefore AD = \frac{1}{2} AC = 5$ cm.

In Δ ADE : $\because (AE)^2 = (13)^2 = 169$

, $(AD)^2 + (DE)^2 = (5)^2 + (12)^2 = 169$

$\therefore (AE)^2 = (AD)^2 + (DE)^2$

$\therefore$ m ($\angle$ ADE) = 90° (Second req.)

5

[a] $\because \frac{1}{2} (24 + 12) \times h = 450$

$\therefore 18 \times h = 450$

$\therefore h = \frac{450}{18} = 25$ cm. (The req.)

[b] $\because$ $\square$ABCD , $\parallel$ AEFD have a comman base , $\overline{AD} // \overline{BF}$

$\therefore$ The area of $\square$ABCD = the area of $\parallel$ AEFD

Subtracting the area of Δ AMD from both sides

$\therefore$ The area of the figure ABCM = the area of the figure DMEF (Q.E.D.)

4 Giza

1

1 (b) 2 (b) 3 (c) 4 (c) 5 (b) 6 (d)

2

1 proportional 2 equal in measure 3 10

4 5 5 3 6 A

3

[a] The area of $\parallel$ ABCD = BC × XD

$= 18 \times 10 = 180$ cm^2.

, $DY = \frac{\text{The area}}{AB} = \frac{180}{12} = 15$ cm. (The req.)

[b] In Δ ABC : $\because (BC)^2 = (10)^2 = 100$

, $(AB)^2 + (AC)^2 = (5)^2 + (7)^2 = 74$

$\therefore (BC)^2 > (AB)^2 + (AC)^2$

$\therefore \Delta$ ABC is an obtuse-angled triangle (The req.)

4

[a] $\because$ $\Delta\Delta$ ACD , ACE have a common base $\overline{AC}$

, $\overline{AC} // \overline{DE}$

$\therefore$ The area of Δ ACD = the area of Δ ACE by adding area of Δ ABC

$\therefore$ The area of the shape ABCD = the area of Δ ABE (Q.E.D.)

[b] The length of the middle base $= \frac{\text{Area}}{h} = \frac{48}{6} = 8$ cm.

, $\because$ The length of the middle base $= \frac{1}{2}(b_1 + b_2)$

$\therefore 8 = \frac{1}{2}(7 + b_2)$

$\therefore 7 + b_2 = 16$

$\therefore b_2 = 16 - 7 = 9$ cm. (The req.)

5

[a] $\because$ $\overline{XY} // \overline{BC}$, $\overrightarrow{XC}$ is a transversal

$\therefore m(\angle C) = m(\angle X)$ (alternate angles)

, $\because m(\angle CAB) = m(\angle XAY)$ (V.O.A.)

$\therefore m(\angle B) = m(\angle Y)$

$\therefore \Delta ABC \sim \Delta AYX$ (First req.)

$\therefore \frac{AB}{AY} = \frac{BC}{YX} = \frac{AC}{AX}$

$\therefore \frac{8}{AY} = \frac{10}{5} = \frac{AC}{3}$

$\therefore AC = \frac{10 \times 3}{5} = 6$ cm. , $AY = \frac{8 \times 5}{10} = 4$ cm. (Second req.)

[b] $\because m(\angle BAC) = 90°$, $\overline{AD} \perp \overline{BC}$

$\therefore (AB)^2 = BD \times BC = 16 \times 25 = 400$

$\therefore AB = 20$ cm.

, $(AD)^2 = BD \times CD = 16 \times 9 = 144$

$\therefore AD = 12$ cm.

, $(AC)^2 = CD \times BC = 9 \times 25 = 225$

$\therefore AC = 15$ cm. (First req.)

, the area of $\Delta ABC = \frac{1}{2} \times BC \times AD$

$= \frac{1}{2} \times 25 \times 12 = 150$ cm^2. (Second req.)

5 Alexandria

1

1 (b) 2 (a) 3 (c) 4 (c) 5 (b) 6 (c)

2

1 a point 2 equal in area

3 equal in measure

4 300° 5 Y 6 B

3

[a] $\because$ $\overline{BH}$ is a median in Δ BXY

$\therefore$ The area of Δ BXH = the area of Δ BYH (1)

, $\because$ XH = YH , $\overline{XY} // \overline{AC}$

$\therefore$ The area of Δ AXH = the area of Δ CYH (2)

Adding (1) and (2) :

$\therefore$ The area of Δ AHB = the area of Δ CHB (Q.E.D.)

[b] $\because (AC)^2 = (9)^2 = 81$

, $(AB)^2 + (BC)^2 = (7)^2 + (8)^2 = 113$

$\therefore (AC)^2 < (AB)^2 + (BC)^2$

$\therefore \Delta$ ABC is an acute-angled triangle (The req.)

4

[a] $\because \overline{DH} // \overline{BC}$, $\overleftrightarrow{AB}$ is a transversal

$\therefore m(\angle B) = m(\angle ADH)$ (corresponding angles)

, $\because \angle A$ is a common angle

$\therefore m(\angle C) = m(\angle AHD)$

$\therefore \Delta ABC \sim \Delta ADH$

$\therefore \frac{AC}{AH} = \frac{BC}{DH}$ $\therefore \frac{27}{9} = \frac{BC}{8}$

$\therefore BC = \frac{8 \times 27}{9} = 24$ cm. (The req.)

[b] $\because$ The area $= \frac{1}{2}(b_1 + b_2) \times h$

$\therefore 50 = \frac{1}{2}(12 + 8) \times h$

$\therefore 50 = 10 \times h$

$\therefore h = \frac{50}{10} = 5$ cm. (The req.)

5

[a] $\because$ ABCD is a parallelogram

$\therefore \overline{AX} // \overline{BY}$, $\because \overline{AB} // \overline{XY}$

$\therefore$ ABYX is a parallelogram

, $\because \overline{AY}$ is a diagonal of $\parallel$gm ABYX

$\therefore$ The area of $\Delta AXY = \frac{1}{2}$ the area of $\parallel$gm ABYX (1)

, $\because \overline{AB} // \overline{XY}$, $\overline{AB} // \overline{CD}$

$\therefore \overline{CD} // \overline{XY}$, $\because \overline{DX} // \overline{CY}$

$\because$ CDXY is a parallelogram

, $\because \Delta XYL$, $\parallel$gm CDXY have a common base $\overline{XY}$

, $\overline{XY} // \overline{DL}$

$\therefore$ The area of $\Delta XYL = \frac{1}{2}$ the area of $\parallel$gm CDXY (2)

Adding (1) and (2) :

$\therefore$ The area of $\Delta AXL = \frac{1}{2}$ the area of $\parallel$gm ABCD (Q.E.D.)

[b] In ΔABC : $\because m(\angle B) = 90°$

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$

In ΔACD : $\because (CD)^2 = (17)^2 = 289$

, $(AD)^2 + (AC)^2 = (8)^2 + 225 = 289$

$\therefore (CD)^2 = (AD)^2 + (AC)^2$

$\therefore m(\angle DAC) = 90°$ (Q.E.D.)

6 El-Kalyoubia

1

1 (b) 2 (a) 3 (c) 4 (d) 5 (d) 6 (d)

2

1 70 2 110° 3 12

4 equal in area 5 4 cm. 6 (5 , 0)

3

[a] $\because \Delta CBE$, $\parallel$gm ABCD have a common base $\overline{BC}$

, $\overline{BC} // \overline{AD}$

$\therefore$ The area of $\Delta CBE = \frac{1}{2}$ the area of $\parallel$gm ABCD(1)

, $\because \overline{EB}$ is a median in ΔEFC

$\therefore$ The area of $\Delta CBE = \frac{1}{2}$ the area of ΔEFC (2)

From (1) , (2) :

$\therefore$ The area of ΔEFC = the area of $\parallel$gm ABCD (Q.E.D.)

[b] In ΔABC : $\because m(\angle B) = 90°$

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$

$\therefore AC = 25$ cm.

In ΔACD : $\because (AC)^2 = 625$

, $(AD)^2 + (CD)^2 = (15)^2 + (20)^2 = 625$

$\therefore (AC)^2 = (AD)^2 + (CD)^2$

$\therefore m(\angle ADC) = 90°$ (First req.)

, $\because \overline{AE}$ is the projection of $\overline{AD}$ on $\overleftrightarrow{AC}$

$\therefore (AD)^2 = AE \times AC$

$\therefore 225 = AE \times 25$

$\therefore AC = \frac{225}{25} = 9$ cm. (Second req.)

4

[a] $\because$ The area of ΔABE = the area of ΔACD

Subtracting the area of ΔADE

$\therefore$ The area of ΔEDB = the area of ΔEDC

and they have a common base $\overline{DE}$ and on one side of it

$\therefore \overline{DE} // \overline{BC}$ (Q.E.D.)

[b] $\because \frac{AC}{DC} = \frac{6}{12} = \frac{1}{2}$, $\frac{CB}{CE} = \frac{1}{2}$

, $\frac{AB}{DE} = \frac{4}{8} = \frac{1}{2}$

$\therefore \frac{AC}{DC} = \frac{CB}{CE} = \frac{AB}{DE}$

$\therefore \Delta ACB \sim \Delta DCE$ (Q.E.D.1)

$\therefore m(\angle ACB) = m(\angle DCE)$

$\therefore \overleftrightarrow{CE}$ bisects $\angle ACD$ (Q.E.D.2)

5

[a] ∵ The area = $\frac{1}{2}$ the product of the diagonal lengths

∴ The area = $\frac{1}{2} \times 72 = 36$ cm^2.

∴ The side length = $\frac{A}{h} = \frac{36}{9} = 4$ cm.

∴ The perimeter = $4 \times 4 = 16$ cm. (The req.)

[b] In Δ DEC : ∵ m (∠ CED) = 90°

∴ $(CE)^2 = (CD)^2 - (ED)^2 = (5)^2 - (3)^2 = 16$

∴ CE = 4 cm. (First req.)

, ∵ Δ ABC ~ Δ DEC

∴ $\frac{AB}{DE} = \frac{AC}{DC}$

∴ $\frac{6}{3} = \frac{AC}{5}$

∴ $AC = \frac{6 \times 5}{3} = 10$ cm. (Second req.)

7 El-Sharkia

1

1 (a) 2 (b) 3 (c) 4 (b) 5 (b) 6 (b)

2

1 side lengths 2 B 3 congruent

4 obtuse-angled 5 3 : 4

6 equal in area

3

[a] In Δ ABC : ∵ m (∠ B) = 90°

∴ $(AC)^2 = (AB)^2 + (BC)^2 = (7)^2 + (24)^2 = 625$

In Δ ADC : ∵ $(AC)^2 = 625$

, $(AD)^2 + (CD)^2 = (15)^2 + (20)^2 = 625$

∴ $(AC)^2 = (AD)^2 + (CD)^2$

∴ m (∠ D) = 90° (Q.E.D.)

[b] ∵ The area of Δ AEB = the area of Δ DEC

Adding the area of Δ ADE to both sides

∴ The area of Δ ADB = the area of Δ ADC

and they have a common base $\overline{AD}$ and on one side of it

∴ $\overline{AD} \parallel \overline{BC}$ (Q.E.D.)

4

[a] ∵ $\overline{BC} \parallel \overline{OL}$, $\overleftrightarrow{AB}$ is a transversal

∴ m (∠ B) = m (∠ AOL) (corresponding angles)

, ∵ ∠ A is a common angle

∴ m (∠ C) = m (∠ ALO)

∴ Δ ABC ~ Δ AOL (First req.)

∴ $\frac{AB}{AO} = \frac{BC}{OL} = \frac{AC}{AL}$ ∴ $\frac{6}{4} = \frac{7.5}{OL} = \frac{AC}{6}$

∴ $OL = \frac{7.5 \times 4}{6} = 5$ cm.

, $AC = \frac{6 \times 6}{4} = 9$ cm.

∴ LC = 9 − 6 = 3 cm. (Second req.)

[b] ∵ m (∠ ABC) = 90° , $\overline{BD} \perp \overline{AC}$

∴ $(AB)^2 = AD \times AC = 4.5 \times 12.5 = 56.25$

∴ AB = 7.5 cm.

, $(BC)^2 = CD \times AC = 8 \times 12.5 = 100$

∴ BC = 10 cm.

, $BD = \frac{AB \times BC}{AC} = \frac{7.5 \times 10}{12.5} = 6$ cm. (The req.)

5

[a] ∵ ΔΔ ADB , ADC have a common base $\overline{AD}$

, $\overline{AD} \parallel \overline{BC}$

∴ The area of Δ ADB = the area of Δ ADC

Subtracting the area of Δ ADF from both sides

∴ The area of Δ AFB = the area of Δ DFC (1)

, ∵ $\overline{BF}$ is a median in Δ ABE

∴ The area of Δ BFE = the area of Δ AFB (2)

From (1) , (2) :

The area of Δ BFE = the area of Δ DFC (Q.E.D.)

[b] The area = $\frac{1}{2}(6 + 4) \times 5 = 25$ cm^2. (The req.)

8 El-Dakahlia

1

1 (b) 2 (c) 3 (a) 4 (c) 5 (c) 6 (b)

2

1 similar 2 40

3 one 4 proportional

5 equal in area 6 right-angled

3

[a] ∵ $\overline{BE}$ is a median in Δ BXY

∴ The area of Δ BXE = the area of Δ BYE (1)

, ∵ XE = YE , $\overline{AC} \parallel \overline{XY}$

∴ The area of Δ AXE = the area of Δ CYE (2)

Adding (1) , (2) :

∴ The area of Δ ABE = the area of Δ CBE (Q.E.D.)

[b] In Δ ABD : ∵ m (∠ A) = 90°

∴ $(BD)^2 = (AB)^2 + (AD)^2 = (15)^2 + (20)^2 = 625$

In Δ BCD : ∵ $(BD)^2 = 625$

, $(BC)^2 + (CD)^2 = (7)^2 + (24)^2 = 625$

∴ $(BD)^2 = (BC)^2 + (CD)^2$

∴ m (∠ C) = 90° (Q.E.D.)

4

[a] ∵ $\overline{AB} // \overline{CD}$, $\overleftrightarrow{AC}$ is a transversal

∴ m (∠ A) = m (∠ C) (alternate angles)

, ∵ m (∠ AEB) = m (∠ CED) (V.O.A.)

∴ m (∠ B) = m (∠ D)

∴ Δ ABE ~ Δ CDE (First req.)

∴ $\frac{BE}{DE} = \frac{AE}{CE}$ ∴ $\frac{2}{DE} = \frac{3}{6}$

∴ $DE = \frac{2 \times 6}{3} = 4$ cm. (Second req.)

[b] ∵ The area of Δ ABE = the area of Δ ACD

Subtracting the area of Δ ADE from both sides

∴ The area of Δ EDB = the area of Δ EDC

, they have a common base $\overline{DE}$ and on one side of it

∴ $\overline{DE} // \overline{BC}$ (Q.E.D.)

5

[a] ∵ m (∠ BAC) = 90°

∴ $(BC)^2 = (AB)^2 + (AC)^2 = (12)^2 + (16)^2 = 400$

∴ BC = 20 cm.

, ∵ $\overline{AD} \perp \overline{BC}$

∴ $AD = \frac{AB \times AC}{BC} = \frac{12 \times 16}{20} = 9.6$ cm. (The req.)

[b] The area = $\frac{1}{2}(10 + 14) \times 8 = 96$ cm^2. (The req.)

9 Ismailia

1

1 (c) 2 (a) 3 (c) 4 (c) 5 (a) 6 (b)

2

1 base 2 $\frac{1}{2}$ 3 the square

4 60° 5 1 6 7

3

[a] ∵ $\overline{AD}$ is a median in Δ ABC

∴ The area of Δ ABD = the area of Δ ACD (1)

, ∵ $\overline{ED}$ is a median in Δ BEC

∴ The area of Δ BED = the area of Δ CED (2)

Subtracting (2) From (1) :

∴ The area of Δ ABE = the area of Δ ACE (Q.E.D.)

[b] ∵ m (∠ BAC) = 90°

∴ $(BC)^2 = (AC)^2 + (AB)^2 = (6)^2 + (8)^2 = 100$

∴ BC = 10 cm.

, ∵ $\overline{AD} \perp \overline{BC}$

∴ $AD = \frac{AB \times AC}{BC} = \frac{8 \times 6}{10} = 4.8$ cm.

, ∵ $(AC)^2 = CD \times BC$ ∴ $(6)^2 = CD \times 10$

∴ $CD = \frac{36}{10} = 3.6$ cm.

∴ BD = 10 − 3.6 = 6.4 cm. (The req.)

4

[a] ∵ $(AC)^2 = (12)^2 = 144$

, $(AB)^2 + (BC)^2 = (6)^2 + (8)^2 = 100$

∴ $(AC)^2 > (AB)^2 + (BC)^2$

∴ Δ ABC is an obtuse-angled triangle (The req.)

[b] The area of Δ NCB = $\frac{1}{2} \times BC \times AE$

$= \frac{1}{2} \times 8 \times 5 = 20$ cm^2.

(The req.)

5

[a] ∵ ΔΔ ADB , ADC have a common base $\overline{AD}$

, $\overline{AD} // \overline{BC}$

∴ The area of Δ ADB = the area of Δ ADC

subtracting the area of Δ ADM from both sides

∴ The area of Δ AMB = the area of Δ DMC (Q.E.D.)

[b] ∵ m (∠ B) = m (∠ E) = 90°

, m (∠ BAC) = m (∠ EAD) (V.O.A.)

∴ m (∠ C) = m (∠ D)

∴ Δ ABC ~ Δ AED (First req.)

∴ $\frac{AB}{AE} = \frac{BC}{ED} = \frac{AC}{AD}$ ∴ $\frac{AB}{3} = \frac{12}{4}$

∴ $AB = \frac{12 \times 3}{4} = 9$ cm.

, in ΔABC : $\because m(\angle B) = 90°$

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$

$\therefore AC = 15$ cm. (Second req.)

10 Damietta

1

1 (c) 2 (c) 3 (d) 4 (b) 5 (c) 6 (a)

2

1 50 2 equal in measure , proportional

3 between two parallel lines

4 length × width 5 1 6 zero

3

[a] $\because$ The area $= \frac{1}{2}(b_1 + b_2) \times h$

$\therefore 70 = \frac{1}{2}(12 + 8) \times h$

$\therefore 70 = 10 \times h$

$\therefore h = \frac{70}{10} = 7$ cm. (The req.)

[b] $\because \overline{ED} // \overline{BC}$, $\overleftrightarrow{AB}$ is a transversal

$\therefore m(\angle AED) = m(\angle B)$ (corresponding angles)

, $\because \angle A$ is a common angle

$\therefore m(\angle ADE) = m(\angle C)$

$\therefore \Delta AED \sim \Delta ABC$ (First req.)

$\therefore \frac{ED}{BC} = \frac{AD}{AC}$ $\therefore \frac{ED}{18} = \frac{4}{12}$

$\therefore ED = \frac{4 \times 18}{12} = 6$ cm. (Second req.)

4

[a] $\because (AC)^2 = (9)^2 = 81$

, $(AB)^2 + (BC)^2 = (7)^2 + (6)^2 = 85$

$\therefore (AC)^2 < (AB)^2 + (BC)^2$

$\therefore \Delta ABC$ is an acute-angled traingle (The req.)

[b] In ΔBCD : $\because m(\angle C) = 90°$

$\therefore (BD)^2 = (BC)^2 + (CD)^2 = (7)^2 + (24)^2 = 625$

In ΔABD : $\because (BD)^2 = 625$

, $(AB)^2 + (AD)^2 = (15)^2 + (20)^2 = 625$

$\therefore (BD)^2 = (AB)^2 + (AD)^2$

$\therefore m(\angle A) = 90°$ (Q.E.D.)

5

[a] $\because \Delta\Delta ABD$, ABC have a common base $\overline{AB}$

, $\overline{AB} // \overline{CD}$

$\therefore$ The area of ΔABD = the area of ΔABC

Subtracting the area of ΔABM from both sides

$\therefore$ The area of ΔADM = the area of ΔBCM (1)

, $\because \overline{ME}$ is a median in ΔDCM

$\therefore$ The area of ΔDME = the area of ΔCME (2)

Adding (1) , (2) :

$\therefore$ The area of the figure ADEM = the area of the figure BCEM (Q.E.D.)

[b] $\because m(\angle BAC) = 90°$, $\overline{AD} \perp \overline{BC}$

$\therefore (AD)^2 = BD \times CD = 9 \times 16 = 144$

$\therefore AD = 12$ cm.

, $(AB)^2 = BD \times BC = 9 \times 25 = 225$

$\therefore AB = 15$ cm.

, $(AC)^2 = CD \times BC = 16 \times 25 = 400$

$\therefore AC = 20$ cm. (The req.)

11 Assiut

1

1 (c) 2 (a) 3 (b) 4 (d) 5 (c) 6 (a)

2

1 120° 2 proportional 3 16

4 18 5 50° 6 equal

3

[a] $\because \overline{AD} // \overline{BC}$, $\overleftrightarrow{AC}$ is a transversal

$\therefore m(\angle A) = m(\angle C)$ (alternate angles)

, $\because m(\angle AED) = m(\angle CEB)$ (V.O.A.)

$\therefore m(\angle D) = m(\angle B)$

$\therefore \Delta AED \sim \Delta CEB$ (First req.)

$\therefore \frac{AE}{CE} = \frac{ED}{EB} = \frac{AD}{CB} = \frac{\text{the perimeter of } \Delta AED}{\text{the perimeter of } \Delta CEB}$

$\therefore \frac{4}{8} = \frac{4+2+3}{\text{the perimeter of } \Delta CEB}$

$\therefore$ The perimeter of $\Delta CEB = \frac{9 \times 8}{4} = 18$ cm.

(Second req.)

[b] The area $= \frac{1}{2}(5 + 9) \times 4 = 28$ cm^2. (The req.)

4

[a] $\because \Delta FBC$, $\square ABCD$ have a common base $\overline{BC}$

, $\overline{AD} // \overline{BC}$

$\therefore$ The area of Δ FBC = $\frac{1}{2}$ the area of $\square$ ABCD (1)

, $\because$ $\overline{FB}$ is a median in Δ FCE

$\therefore$ The area of Δ FCB = $\frac{1}{2}$ the area of Δ FCE (2)

From (1) , (2) :

$\therefore$ The area of Δ FCE = the area of $\square$ ABCD (Q.E.D.)

[b] $\because (AC)^2 = (9)^2 = 81$

$, (AB)^2 + (BC)^2 = (7)^2 + (6)^2 = 85$

$\therefore (AC)^2 < (AB)^2 + (BC)^2$

$\therefore$ Δ ABC is an acute-angled triangle. (The req.)

5

[a] $\because$ m ($\angle$ BAC) = 90° , $\overline{AE} \perp \overline{BC}$

$\therefore (BC)^2 = (AC)^2 + (AB)^2 = (15)^2 + (20)^2 = 625$

$\therefore$ BC = 25 cm.

, $\because$ $\overline{BE}$ is the projection of $\overline{AB}$ on $\overleftrightarrow{BC}$

, $\because (AB)^2 = BE \times BC$

$\therefore (20)^2 = BE \times 25$

$\therefore BE = \frac{400}{25} = 16$ cm. (First req.)

, EC = 25 – 16 = 9 cm. (Second req.)

[b] $\because$ The area of Δ ADC = the area of Δ AEB

Subtracting the area of Δ ADE from both sides

$\therefore$ The area of Δ EDC = the area of Δ EDB

, they have a common base $\overline{DE}$ and on one side of it

$\therefore$ $\overline{DE} // \overline{BC}$ (Q.E.D.)

12 South Sinai

1

1 (a) 2 (b) 3 (d) 4 (b) 5 (b) 6 (c)

2

1 $\frac{1}{2}$ × base length × height 2 24 3 equal

4 proportional , equal in measure

5 C 6 45

3

[a] $\because$ $\Delta\Delta$ ADB , ADC have a common base $\overline{AD}$

, $\overline{AD} // \overline{BC}$

$\therefore$ The area of Δ ADB = the area of Δ ADC

Subtracting the area of Δ ADE from both sides

$\therefore$ The area of Δ ABE = the area of Δ DCE (Q.E.D.)

[b] $\because (AC)^2 = (11)^2 = 121$

$, (AB)^2 + (BC)^2 = (6)^2 + (8)^2 = 100$

$\therefore (AC)^2 > (AB)^2 + (BC)^2$

$\therefore$ Δ ABC is an obtuse-angled triangle (The req.)

4

[a] $\because$ m ($\angle$ BAC) = 90° , $\overline{AD} \perp \overline{BC}$

$\therefore (AC)^2 = CD \times BC = 16 \times 25 = 400$

$\therefore$ AC = 20 cm.

$, (AD)^2 = CD \times BD = 16 \times 9 = 144$

$\therefore$ AD = 12 cm. (The req.)

[b] $\because$ m ($\angle$ AED) = m ($\angle$ B)

, $\angle$ A is a common angle

$\therefore$ m ($\angle$ ADE) = m ($\angle$ C)

$\therefore$ Δ ADE ~ Δ ACB (First req.)

$\therefore \frac{AD}{AC} = \frac{AE}{AB}$ $\therefore \frac{3}{AC} = \frac{4.5}{9}$

$\therefore AC = \frac{3 \times 9}{4.5} = 6$ cm.

$\therefore$ EC = 6 – 4.5 = 1.5 cm. (Second req.)

5

[a] $\because$ $\square$ ABCD , $\square$ ABMN have a common base $\overline{AB}$

, $\overline{AB} // \overline{CN}$

$\therefore$ The area of $\square$ ABCD = the area of $\square$ ABMN (1)

, $\because$ Δ EBC , $\square$ ABCD have a common base $\overline{BC}$

, $\overline{AD} // \overline{BC}$

$\therefore$ The area of Δ EBC = $\frac{1}{2}$ the area of $\square$ ABCD (2)

From (1) , (2) :

$\therefore$ The area of Δ EBC = $\frac{1}{2}$ the area of $\square$ ABMN (Q.E.D.)

[b] $\because$ The side length of the square = 24 ÷ 4 = 6 cm.

$\therefore$ The area of Δ AEC = $\frac{1}{2} \times CE \times AB$

$= \frac{1}{2} \times 3 \times 6 = 9$ cm^2.

(The req.)

امتحانات رقم (3)

الترم الثانى

2023

Some Schools Examinations on Geometry

1 Cairo Governorate

East Nasr City Educational Administration
Manarat Al Salem Language School

Answer the following questions :

1 Choose the correct answer :

1 The trapezium whose area is 30 cm.^{2} and its height is 5 cm. , then its middle base length is ..... cm.

(a) 6 (b) 30 (c) 150 (d) 3

2 If two polygons are similar and the ratio between the lengths of two corresponding sides is 3 : 5 , then the ratio between their perimeters is .....

(a) 5 : 3 (b) 3 : 5 (c) 1 : 2 (d) 1 : 3

3 The diagonals of an isosceles trapezium are .....

(a) congruent. (b) perpendicular.

(c) bisecting each other. (d) parallel.

4 ABC is a triangle , if $(AC)^2 > (AB)^2 + (BC)^2$, then $\angle B$ is .....

(a) obtuse. (b) acute. (c) right. (d) straight.

5 The length of the projection of a given line segment ..... the length of the original line segment.

(a) $\geq$ (b) $>$ (c) $\leq$ (d) $=$

2 Complete the following :

1 The median of a triangle divides it into two triangles ..... in area.

2 The measure of the exterior angle of an equilateral triangle is .....°

3 The base length of a parallelogram is 7 cm. and the corresponding height is 4 cm. , then its area equals ..... cm.^{2}

4 If the area of a square is 18 cm.^{2} , then the length of its diagonal is ..... cm.

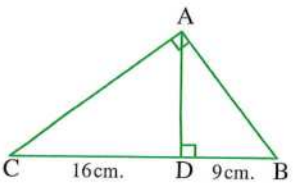
5 In a triangle , if the sum of the areas of two squares on two sides is equal to the area of the square on the third side , then the angle opposite to this side is .....

3 [a] In the opposite figure :

m ($\angle$ BAC) = 90°

, $\overline{AD} \perp \overline{BC}$, BD = 9 cm. , DC = 16 cm.

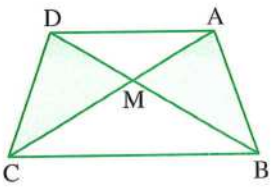
Find : The length of each of $\overline{AB}$, $\overline{AC}$, $\overline{AD}$



[b] In the opposite figure :

If the area of Δ AMB = the area of Δ CMD

, **prove that :** $\overline{AD} \parallel \overline{BC}$



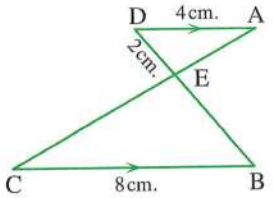
4 **[a] In the opposite figure :**

$\overline{AD} \parallel \overline{BC}$, AD = 4 cm.

, BC = 8 cm. , DE = 2 cm.

1 **Prove that :** Δ ADE ~ Δ CBE

2 **Find :** the length of $\overline{BE}$



[b] Identify the type of Δ BAC according to the measures of its angles where

AB = 7 cm. , BC = 9 cm. , AC = 12 cm.

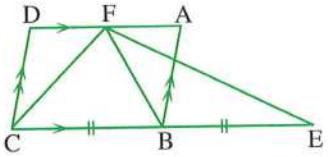
5 **[a] In the opposite figure :**

ABCD is a parallelogram

, $E \in \overrightarrow{CB}$, $F \in \overline{AD}$, CB = BE

Prove that :

The area of Δ FEC = The area of the parallelogram ABCD



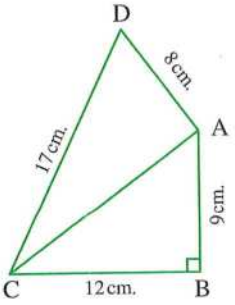
[b] In the opposite figure :

AB = 9 cm. , BC = 12 cm.

, AD = 8 cm. , DC = 17 cm.

, m (∠ B) = 90°

Prove that : m (∠ DAC) = 90°



2 Cairo Governorate

Cairo Education zone
Hadyek El-Maady O.L.S.

Answer the following questions :

1 **Choose the correct answer :**

1 A rhombus has diagonal lengths 6 cm. and 8 cm. , its area = ... cm^2

(a) 12 (b) 24 (c) 48 (d) 8

2 The triangle whose side lengths are 6 cm. , 8 cm. and 10 cm. is .....

(a) acute-angled. (b) right-angled. (c) obtuse-angled. (d) isosceles.

3 If two triangles are similar , then the corresponding sides are .....

(a) proportional. (b) equal. (c) congruent. (d) parallel.

4 The number of axes of symmetry of the equilateral triangle is .....

(a) 1 (b) 2 (c) 3 (d) 4

5 The triangle whose base length is 6 cm. and its corresponding height is 5 cm. , its area is ..... cm^2

(a) 30 (b) 12 (c) 15 (d) 6

2 Complete the following by the correct answers :

1 The median of the triangle divides it into two triangles ..... in area.

2 The area of the parallelogram = length of base × corresponding .....

3 A square is of side length 5 cm. , its area is ..... cm^2

4 The polygon ABCD is similar to the polygon XYZL , then m (∠ BCD) = m (∠ .....)

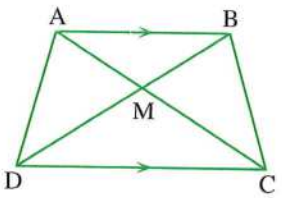
5 The sum of measures of the interior angles of a triangle equals .....°

3 [a] In the opposite figure :

$\overline{AB} // \overline{DC}$

Prove that :

The area of Δ BMC = the area of Δ AMD



[b] In the opposite figure :

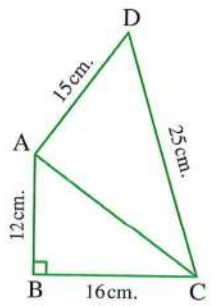
ABCD is a quadrilateral where m (∠ ABC) = 90°

, AB = 12 cm. , BC = 16 cm. , CD = 25 cm.

and AD = 15 cm.

1 **Find :** The length of $\overline{AC}$

2 **Prove that :** The triangle ADC is a right-angled triangle.



4 [a] Determine the type of the triangle ABC according to its angles where AB = 7 cm. , BC = 3 cm. and AC = 6 cm.

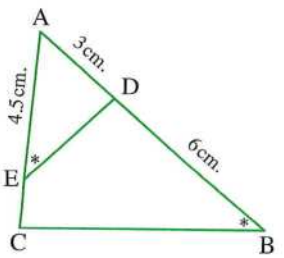
[b] In the opposite figure :

m (∠ AED) = m (∠ ABC)

, AD = 3 cm. , AE = 4.5 cm. , DB = 6 cm.

1 **Prove that :** Δ AED ~ Δ ABC

2 **Find :** The length of $\overline{EC}$

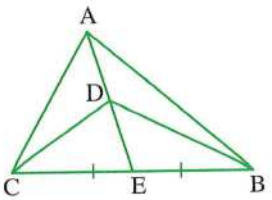


5 [a] A trapezium of lengths of two parallel bases 6 cm. and 4 cm. Find its area if its height is 5 cm.

[b] **In the opposite figure :**

$\overline{AE}$ is a median in the triangle ABC

Prove that : The area of Δ ABD = the area of Δ ACD



3 Giza Governorate — Mathematics Inspection

Answer the following questions :

1 Choose the correct answer :

1 If $\Delta ABC \sim \Delta DEF$, $m(\angle B) = 50°$, $m(\angle C) = 60°$, then $m(\angle D)$ = ...

(a) 70° (b) 90° (c) 110° (d) 180°

2 In ΔABC , if $(AC)^2 = (AB)^2 + (BC)^2$, then $\angle B$ is ..... angle.

(a) a right (b) an acute (c) an obtuse (d) a reflex

3 The ratio between the area of a triangle and the area of a parallelogram if they have a common base and included between two parallel straight lines equals .....

(a) 1 : 2 (b) 1 : 3 (c) 2 : 1 (d) 2 : 3

4 If the projection of a line segment on a straight line is a point , then the line segment is ..... to the straight line.

(a) $\in$ (b) $\equiv$ (c) $\perp$ (d) //

5 If two polygons are similar , then their corresponding angles are ..... in measure.

(a) equal (b) different (c) proportional (d) supplementary

2 Complete :

1 If ΔABC is right-angled at B , AB = 3 cm. , BC = 4 cm. , then AC = ... cm.

2 The base length in a parallelogram is 8 cm. and its corresponding height is 6 cm. , then its area equals ..... cm^2.

3 Two triangles which have the same base and their vertices opposite to this base lie on a straight line parallel to the base are .....

4 A square of diagonal length 10 cm. , then its area equals ..... cm^2.

5 A rhombus of diagonal lengths are 4 cm. and 6 cm. , then its area equals ..... cm^2.

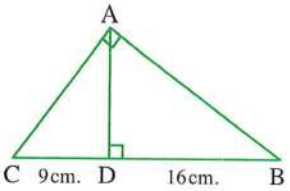
3 [a] Determine the type of the angle B in ΔABC in which AB = 6 cm. , BC = 8 cm. and AC = 10 cm.

[b] In the opposite figure :

m (∠ BAC) = m (∠ BDA) = 90°

, DB = 16 cm. , DC = 9 cm.

Find : the length of each of $\overline{AB}$ and $\overline{AD}$



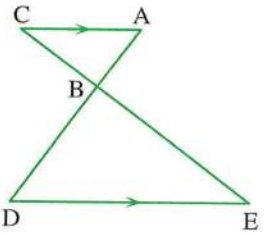
4 **[a]** Find the area of the trapezium whose lengths of its two parallel bases are 4 cm. and 6 cm. and its height is 3 cm.

[b] In the opposite figure :

$\overline{AC}$ // $\overline{ED}$

Prove that :

Δ ABC ~ Δ DBE



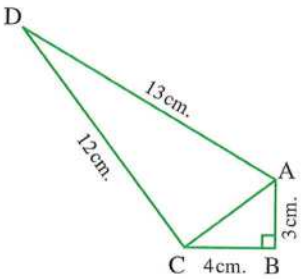
5 **[a] In the opposite figure :**

AB = 3 cm. , BC = 4 cm. , AD = 13 cm.

, CD = 12 cm. , m (∠ B) = 90°

1 **Find :** the length of $\overline{AC}$

2 **Prove that :** m (∠ ACD) = 90°



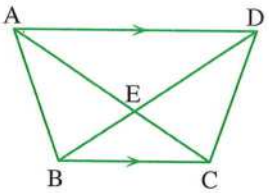
[b] In the opposite figure :

ABCD is a quadrilateral

in which $\overline{AD}$ // $\overline{BC}$

Prove that :

The area of Δ AEB = the area of Δ DEC



4 Giza Governorate

North Giza Educational Administration
El-Orman Language School

Answer the following questions :

1 **Choose the correct answer from those given :**

1 The area of the rhombus whose diagonal lengths are 6 cm. and 8 cm. equals ..... cm^2

(a) 7 (b) 24 (c) 48 (d) 14

2 ABCD is a parallelogram in which m (∠ A) = 120° , then m (∠ B) = ... °

(a) 120 (b) 60 (c) 90 (d) 180

3 If Δ ABC ≡ Δ XYZ and m (∠ X) = 70° , then m (∠ A) = ... °

(a) 70 (b) 55 (c) 50 (d) 80

4 If $\Delta ABC \sim \Delta XYZ$, then $m(\angle B) = m(\angle \ldots\ldots)$

(a) C (b) Z (c) X (d) Y

5 ABC is a triangle in which $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

2 Complete :

1 The two polygons are similar if their corresponding side lengths are ..... and their corresponding angles are .....

2 If $\Delta ABC \sim \Delta XYZ$, $m(\angle A) + m(\angle B) = 60°$, then $m(\angle Z) = \ldots\ldots°$

3 If ΔABC is an obtuse-angled triangle at B , then $(AC)^2$ ..... $(AB)^2 + (BC)^2$

4 If the length of the diagonal of a square is 10 cm. , then its area is ..... cm^2

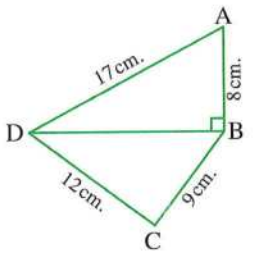
5 If the ratio between the lengths of two corresponding sides of two similar polygons is 2 : 5 and the perimeter of the smaller one is 12 cm. , then the perimeter of the other one is .....

3 [a] In the opposite figure :

ABCD is a quadrilateral in which :

AB = 8 cm. , BC = 9 cm.

, CD = 12 cm. , AD = 17 cm. and $\overline{DB} \perp \overline{AB}$



1 **Find :** the length of $\overline{BD}$

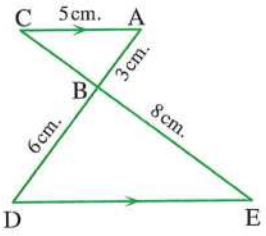
2 **Prove that :** $m(\angle C) = 90°$

[b] Identify the type of ΔABC according to the measures of its angles where AB = 5 cm. , BC = 6 cm. , AC = 7 cm.

4 [a] In the opposite figure :

$\overline{AC} // \overline{ED}$, $\overline{AD} \cap \overline{CE} = \{B\}$, AC = 5 cm.

, AB = 3 cm. , BD = 6 cm. , BE = 8 cm.



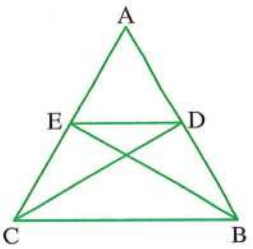
1 **Prove that :** $\Delta ABC \sim \Delta DBE$

2 **Find :** the perimeter of the triangle BED

[b] In the opposite figure :

If the area of ΔADC = the area of ΔAEB

, prove that : $\overline{DE} // \overline{BC}$



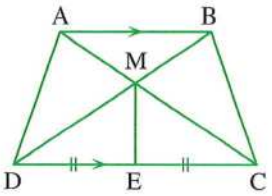
5 **[a] In the opposite figure :**

$\overline{AB} // \overline{DC}$, $\overline{AC} \cap \overline{BD} = \{M\}$

, E is the midpoint of $\overline{CD}$

Prove that :

the area of the figure ADEM = the area of the figure BCEM



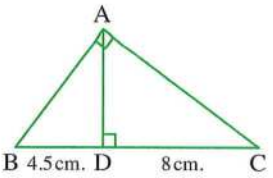
[b] In the opposite figure :

ABC is a triangle , m ($\angle$ BAC) = 90°

, $\overline{AD} \perp \overline{BC}$, BD = 4.5 cm.

, DC = 8 cm.

Find : AD , AB , AC



5 Alexandria Governorate

Middle Educational Zone
Math Supervision

Answer the following questions :

1 **Choose the correct answer :**

1 If $\overline{AB}$ is perpendicular to $\overleftrightarrow{XY}$, then the length of the projection of $\overline{AB}$ on $\overleftrightarrow{XY}$ .....

(a) = 0 (b) < AB (c) > AB (d) = AB

2 In Δ ABC , if $(AB)^2 < (BC)^2 + (AC)^2$, then $\angle$ C is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

3 If Δ ABC $\sim \Delta$ DEO , 3 AB = DE , then BC = ... EO

(a) 2 (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) 3

4 In Δ XYZ , if m ($\angle$ Y) = 90° , XY = 6 cm. , XZ = 10 cm. , then YZ = ... cm.

(a) 16 (b) 4 (c) 40 (d) 8

5 All ..... are similar.

(a) squares (b) triangles (c) rectangles (d) parallelograms

2 **Complete each of the following :**

1 The area of the triangle whose base length is 6 cm. and its corresponding height is 8 cm. equals ..... cm^2.

2 Two triangles are similar if the corresponding angles are .....

3 The area of the square whose side length is 4 cm. equals ..... cm^2.

4 A rectangle is a ..... with equal angles.

5 The area of the trapezium whose middle base is of length 7 cm. and its height is 6 cm. equals ..... cm^2.

3 [a] Determine the type of the angle X in the Δ XYZ in which
XY = 4 cm. , YZ = 7 cm. , XZ = 5 cm.

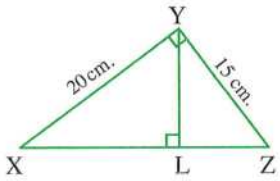
[b] Find the area of the parallelogram ABCD in which $\overline{AE} \perp \overline{BC}$ intersecting it at E , AE = 24 cm. , BC = 50 cm.

---

4 [a] **In the opposite figure :**

XYZ is a triangle in which $\overline{YL} \perp \overline{XZ}$, m ($\angle$ XYZ) = 90° , YZ = 15 cm. , XY = 20 cm.

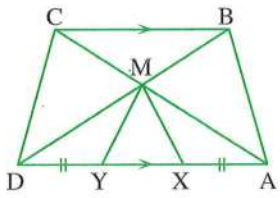
Find : The lengths of $\overline{XZ}$, $\overline{YL}$



[b] **In the opposite figure :**

If $\overline{AD} // \overline{BC}$, AX = DY , **prove that :**

the area of the figure ABMX = the area of the figure DCMY



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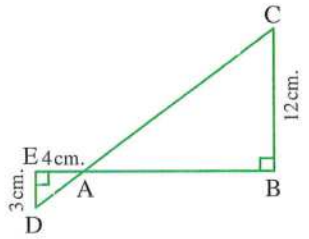
5 [a] **In the opposite figure :**

If $\overline{BE} \cap \overline{DC} = \{A\}$, m ($\angle$ E) = m ($\angle$ B) = 90° , AE = 4 cm. , ED = 3 cm. , BC = 12 cm. , **prove that :** Δ ABC ~ Δ AED , **then find :** the length of $\overline{BE}$



[b] Find the area of the rhombus whose diagonal lengths are 10 cm. , 8 cm.

6 El-Kalyoubia Governorate Math Supervision

Answer the following questions :

1 **Choose the correct answer :**

1 The lengths of two adjacent sides of a parallelogram are 8 cm. and 5 cm. and the smaller height is 4 cm. , then its area equals ..... cm^2

(a) 17 (b) 32 (c) 20 (d) 52

2 The median of the triangle divides its surface into two triangles .....

(a) congruent. (b) equal in area.

(c) equal in perimeter. (d) similar.

3 The ratio between the lengths of two corresponding sides in two similar triangles is 3 : 5 , then the ratio between their perimeters equals .....

(a) 5 : 2 (b) 5 : 3 (c) 3 : 5 (d) 1 : 2

4 Δ ABC is a right-angled triangle at B , then the projection of $\overline{AB}$ on $\overleftrightarrow{BC}$ is .....

(a) $\overline{AB}$ (b) $\overline{BC}$ (c) $\{B\}$ (d) 0

5 In Δ ABC if $(AC)^2 > (AB)^2 + (BC)^2$, then the type of $\angle$ A is .....

(a) right. (b) acute. (c) straight. (d) obtuse.

2 Complete each of the following :

1 The measure of the exterior angle of an equilateral triangle equals ..... °

2 The two triangles are similar if their side lengths are .....

3 A rhombus its diagonal lengths are 8 cm. , 6 cm. , then its area equals ..... cm^2

4 The two triangles drawn on a common base and their vertices are on a straight line parallel to the base are .....

5 If the ratio of enlargement between two similar polygons is 1 , then the two polygons are .....

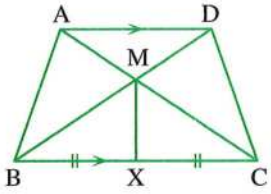
3 [a] The lengths of two parallel bases in a trapezium are 10 cm. and 8 cm. , and its height is 5 cm. Find the length of its middle base and its area.

[b] In the opposite figure :

$\overline{AD}$ // $\overline{BC}$ and X is the midpoint of $\overline{BC}$

Prove that :

The area of the figure ABXM = the area of the figure DCXM

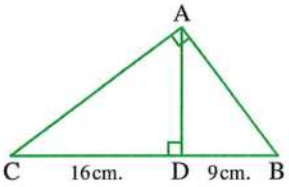


4 [a] In the opposite figure :

ABC is a right-angled triangle at A

, $\overline{AD} \perp \overline{BC}$, DB = 9 cm. , CD = 16 cm.

Find : The length of each of $\overline{AD}$, $\overline{AB}$, $\overline{AC}$



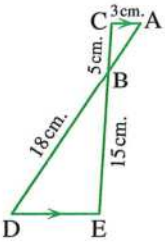
[b] In the opposite figure :

$\overline{AC}$ // $\overline{ED}$, AC = 3 cm. , BC = 5 cm.

, BD = 18 cm. , BE = 15 cm.

1 **Prove that :** Δ ABC ~ Δ DBE

2 **Find :** The length of each of $\overline{AB}$, $\overline{ED}$



5 [a] In the opposite figure :

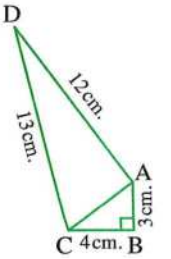
ABCD is a quadrilateral where m ($\angle$ ABC) = 90°

, AB = 3 cm. , BC = 4 cm.

, AD = 12 cm. , DC = 13 cm.

1 **Find :** The length of $\overline{AC}$

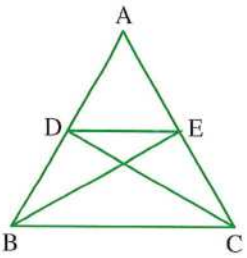
2 **Prove that :** m ($\angle$ DAC) = 90°



[b] In the opposite figure :

The area of Δ ABE = the area of Δ ACD

Prove that : $\overline{DE} \parallel \overline{BC}$



7 El-Sharkia Governorate

Directorate of Education
Omar Al-Farouk Governmental Language School

Answer the following questions :

1 Complete the following :

1. The area of a trapezium is 50 cm^2 and its middle base is of length 10 cm. , then its height equals ..... cm.
2. In Δ ABC , if $(AB)^2 = (AC)^2 + (BC)^2$, then ∠ ..... is right.
3. The area of a triangle = half × ..... × corresponding height.
4. If Δ ABC ~ Δ XYZ , then m (∠ A) = m (∠ .....)
5. The median of a triangle divides its surface into two triangles ..... in area.

2 Choose the correct answer :

1. All ..... are similar.

   (a) triangles (b) pentagons (c) squares (d) rectangles

2. If $\overline{AB} \parallel \overleftrightarrow{XY}$, then the length of the projection of $\overline{AB}$ on $\overleftrightarrow{XY}$ ..... the length of $\overline{AB}$

   (a) > (b) < (c) ≠ (d) =

3. The area of a parallelogram is 50 cm^2 and the length of its base is 10 cm. , then the corresponding height is ..... cm.

   (a) 12 (b) 25 (c) 5 (d) 10

4. A square is of perimeter 4 cm. , then its area equals ..... cm^2

   (a) 4 (b) 1 (c) 16 (d) 8

5. If the ratio between the perimeters of two similar polygons is 4 : 7 , then the ratio between the lengths of two corresponding sides of the two polygons is .....

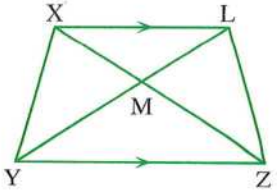
   (a) 2 : 7 (b) 4 : 7 (c) 7 : 4 (d) 2 : 1

3 [a] In the opposite figure :

$\overline{XL} \parallel \overline{YZ}$

, M is the point of intersection of the diagonals.

Prove that : The area of Δ ZML = the area of Δ YMX



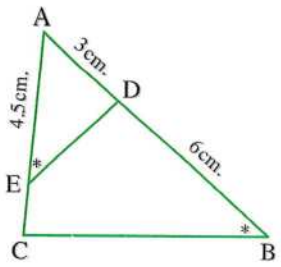
[b] In the opposite figure :

m (∠ AED) = m (∠ B) , AD = 3 cm.

, AE = 4.5 cm. , DB = 6 cm.

1 **Prove that :** Δ ADE ~ Δ ACB

2 **Find :** The length of $\overline{EC}$



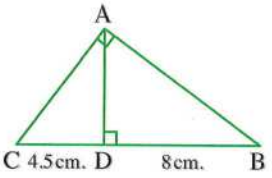
4 **[a] In the opposite figure :**

m (∠ BAC) = 90° , $\overline{AD} \perp \overline{BC}$

, CD = 4.5 cm. and DB = 8 cm.

Find : 1 The length of $\overline{AC}$

2 The area of Δ ABC



[b] In the opposite figure :

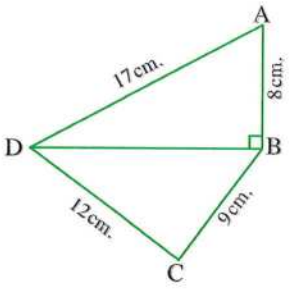
m (∠ ABD) = 90° , AB = 8 cm.

, AD = 17 cm. , BC = 9 cm.

, DC = 12 cm.

1 **Find :** The length of $\overline{BD}$

2 **Prove that :** m (∠ C) = 90°



5 **[a]** A parallelogram , whose side lengths are 5 cm. and 7 cm. and its smaller height is 4 cm. Find the area of the parallelogram and the greater height.

[b] XYZ is a triangle where XY = 12 cm. , YZ = 13 cm. , XZ = 4 cm. Determine the type of the triangle according to the measures of its angles.

8 El-Monofia Governorate

Quesna Educational Directorate
Math Supervision

Answer the following questions :

1 **Complete :**

1 The area of a square is 50 cm^2 , then the length of its diagonal is .....

2 The median of a triangle divides its surface into two triangles .....

3 If the point A ∈ the straight line L , then the projection of A on L is .....

4 The area of a triangle is equal to half of the area of a parallelogram if they have .....

5 The type of the triangle ABC where AB = 8 cm. , AC = 17 cm. , BC = 15 cm. according to its angles is .....

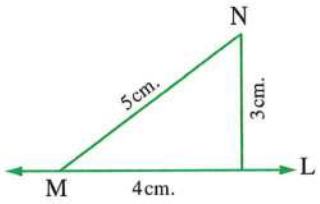
2 Choose the correct answer :

1 The ratio between the lengths of two corresponding sides of two similar polygons is 3 : 5 , then the ratio between their perimeters is .....

(a) 2 : 5 (b) 3 : 5 (c) 5 : 4 (d) 5 : 2

2 **In the opposite figure :**

The length of the projection of $\overline{MN}$ on the straight line L is .....



(a) 3 cm. (b) 4 cm.

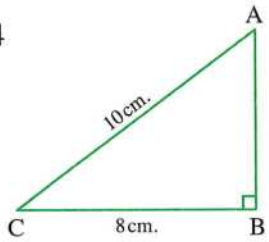
(c) 5 cm. (d) zero

3 The number of axes of symmetry of the isosceles trapezium is .....

(a) 1 (b) 2 (c) 3 (d) 4

4 **In the opposite figure :**

The area of Δ ABC is ..... cm^2



(a) 24 (b) 40

(c) 48 (d) 80

5 If Δ ABC is an obtuse-angled triangle at B , then $(AB)^2 + (BC)^2$ ..... $(AC)^2$

(a) < (b) > (c) ≤ (d) ≥

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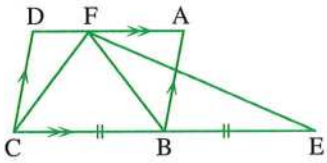
3 [a] In the opposite figure :

ABCD is a parallelogram , CB = BE

Prove that : The area of Δ FEC = the area of ▱ ABCD

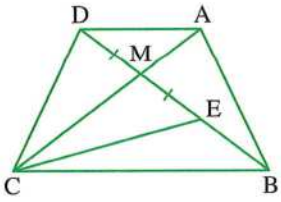


[b] In the opposite figure :

ME = MD

, the area of Δ AMB = the area of Δ CME

Prove that : $\overline{AD} // \overline{BC}$



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4 [a] Two pieces of land have equal area , one of them has the shape of a rhombus whose diagonal lengths are 18 m. , 24 m. and the other has the shape of a trapezium whose height is 12 m. Find the length of its middle base.

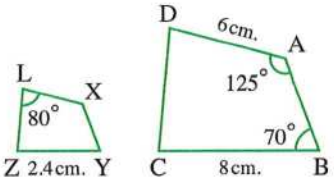
[b] In the opposite figure :

The figure ABCD ~ the figure XYZL

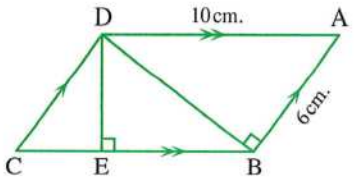
Calculate : m (∠ BCD) , the length of $\overline{XL}$

If the perimeter of ABCD = 26 cm.

, **find :** the perimeter of XYZL



5 [a] In the opposite figure :



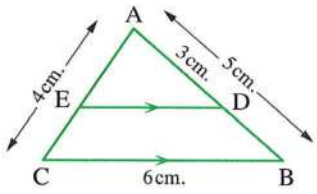
ABCD is a parallelogram , AB = 6 cm. , AD = 10 cm.
, $\overline{DB} \perp \overline{AB}$, $\overline{DE} \perp \overline{BC}$

Find : [1] The area of the parallelogram ABCD

[2] The length of the projection of $\overline{DB}$ on $\overleftrightarrow{BC}$

[3] The length of $\overline{DE}$

[b] In the opposite figure :



ABC is a triangle , AB = 5 cm.
, BC = 6 cm. , AC = 4 cm.
, AD = 3 cm. , $\overline{DE} // \overline{BC}$

[1] **Prove that :** $\Delta ADE \sim \Delta ABC$

[2] **Find :** The length of each of $\overline{ED}$ and $\overline{AE}$

9 El-Gharbia Governorate

The Central Math Supervision
Governorate Language Schools

Answer the following questions :

1 Complete the following :

[1] The diagonal length of the square whose area is 50 cm^2 equals .....

[2] Each of two polygons is similar to a third are .....

[3] ABC is a triangle , AB = 8 cm. , BC = 9 cm. and AC = 6 cm. , then its type according to its angles is .....

[4] The projection of a line segment on a straight line perpendicular to it is .....

[5] The measure of the angle of the regular octagon equals .....°

2 Choose the correct answer from those given :

[1] In ΔXYZ , if $(XZ)^2 = (XY)^2 - (ZY)^2$, then $\angle Y$ is ..... angle.

(a) a straight (b) an obtuse (c) a right (d) an acute

[2] ABCD is a parallelogram in which m ($\angle A$) = 70° , then m ($\angle B$) = ...

(a) 70° (b) 110° (c) 180° (d) 140°

[3] If the area of a triangle is 24 cm^2 and its height is 8 cm. , then the length of the corresponding base is ..... cm.

(a) 16 (b) 6 (c) 3 (d) 12

[4] A trapezium whose lengths of two parallel bases are 6 cm. and 8 cm. , then the length of its middle base equals ..... cm.

(a) 48 (b) 24 (c) 14 (d) 7

5 If the perimeter of a square equals $(3x - 1)$ cm. and the area of this square equals $25\ cm^2$, then $x =$ .....

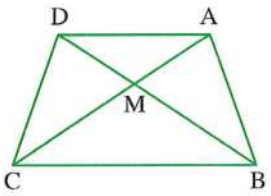
(a) 5 (b) 8 (c) 6 (d) 7

3 [a] In the opposite figure :

ABCD is a quadrilateral

, the area of Δ AMB = the area of Δ DMC

Prove that : $\overline{AD} // \overline{BC}$



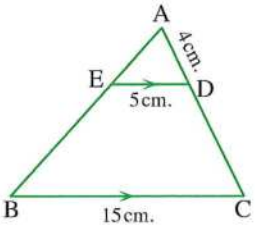
[b] In the opposite figure :

$\overline{ED} // \overline{BC}$, AD = 4 cm.

, ED = 5 cm.

, BC = 15 cm.

Find with proof : the length of $\overline{DC}$

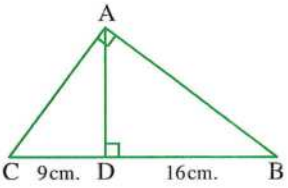


4 [a] In the opposite figure :

m ($\angle$ BAC) = 90° , $\overline{AD} \perp \overline{CB}$

, CD = 9 cm. , DB = 16 cm.

Find : The length of each of $\overline{AB}$, $\overline{AC}$ and $\overline{AD}$



[b] ABCD is a trapezium in which $\overline{AD} // \overline{BC}$, if BC = 2 AD = 20 cm. and its area = $180\ cm^2$. , find its height.

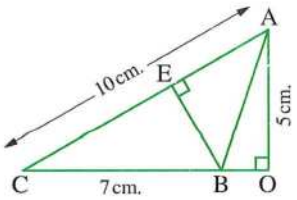
5 [a] In the opposite figure :

$\overline{AO} \perp \overleftrightarrow{CB}$, $\overline{BE} \perp \overline{AC}$

, AC = 10 cm. , BC = 7 cm. and AO = 5 cm.

Find : 1 The length of $\overline{BE}$

2 The area of Δ ABC



[b] ABCD is a parallelogram in which AB = 8 cm. , AC = 20 cm. and BD = 12 cm.

Prove that : m ($\angle$ ABD) = 90° **, then find :** the area of this parallelogram.

10 El-Dakahlia Governorate — Maths Supervision

Answer the following questions :

1 Choose the correct answer from those given :

1 If the height of a triangle is 8 cm. , its corresponding base length is 6 cm. , then its surface area equals ..... cm^2

(a) 24 (b) 42 (c) 48 (d) 68

2 If the perimeter of a square is 20 cm. , then its area equals .....

(a) 20 cm^2 (b) 25 cm^2 (c) 50 cm^2 (d) 100 cm^2

3 The rhombus whose lengths of its diagonals are 6 cm. , 10 cm. , then its area equals ..... cm^2

(a) 10 (b) 15 (c) 30 (d) 60

4 The length of the middle base of a trapezium whose parallel base lengths are 6 cm. , 8 cm. is ..... cm.

(a) 7 (b) 14 (c) 24 (d) 48

5 Δ ABC is right-angled at B , AB = 6 cm. , BC = 8 cm. , $\overline{BD} \perp \overline{AC}$ intersecting it at D , then the length of $\overline{BD}$ = ... cm.

(a) 5 (b) 10 (c) 4.8 (d) 2.4

2 Complete each of the following :

1 If the enlargement ratio of two similar polygons = 1 , then the two polygons are .....

2 The number of rectangles in the opposite figure is .....

3 If Δ ABC is obtuse-angled at B , then $(AC)^2$ ..... $(AB)^2 + (BC)^2$

4 If $\Delta ABC \sim \Delta XYZ$, $m(\angle A) + m(\angle B) = 100°$, then $m(\angle Z)$ = ...°

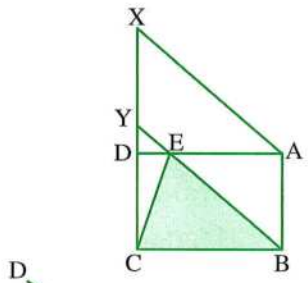
5 The triangle whose side lengths are 6 cm. , 8 cm. , 11 cm. , then its type according to its angles is .....

3 [a] In the opposite figure :

ABCD is a rectangle , ABYX is a parallelogram

Prove that :

The area of Δ EBC = $\frac{1}{2}$ the area of the parallelogram ABYX



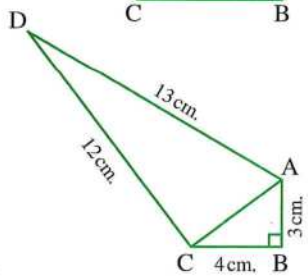
[b] In the opposite figure :

$m(\angle B) = 90°$

, AB = 3 cm. , BC = 4 cm.

, DA = 13 cm. , DC = 12 cm.

Prove that : $m(\angle ACD) = 90°$



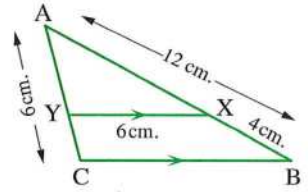
4 [a] In the opposite figure :

$\overline{XY} // \overline{BC}$, AC = XY = 6 cm.

, AB = 12 cm. , XB = 4 cm.

1 **Prove that :** $\Delta AXY \sim \Delta ABC$

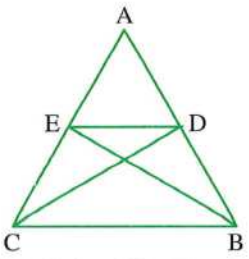
2 **Find :** The length of $\overline{BC}$



[b] In the opposite figure :

The area of Δ ABE = the area of Δ ACD

Prove that : $\overline{DE} \parallel \overline{BC}$

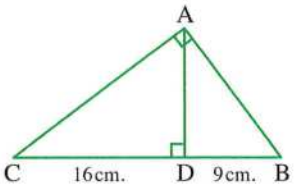


5 [a] In the opposite figure :

Δ ABC is right-angled at A , $\overline{AD} \perp \overline{BC}$

, BD = 9 cm. , CD = 16 cm.

Find : The length of each of $\overline{AB}$, $\overline{AD}$



[b] Find the area of the trapezium with two parallel base lengths 8 cm. , 10 cm. and its height is 6 cm.

11 Ismailia Governorate

Directorate of Education
Directing Mathematics

Answer the following questions :

1 Choose the correct answer :

1 The rhombus whose diagonal lengths are 6 cm. , 10 cm. has an area ..... cm^2

(a) 60 (b) 30 (c) 15 (d) 10

2 In Δ ABC , if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle$ C is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

3 The rectangle has ..... axes of symmetry.

(a) 1 (b) 2 (c) 3 (d) 4

4 If the area of a triangle is 24 cm^2 and its height is 8 cm. , then the length of the corresponding base equals ..... cm.

(a) 16 (b) 6 (c) 3 (d) 2

5 The diagonal length of a square whose area is 18 cm^2 is ..... cm.

(a) 2 (b) 6 (c) 9 (d) 36

2 Complete the following :

1 The sum of measures of two complementary angles is .....°

2 The area of the parallelogram = ... the area of the triangle with common base and lies between two parallel lines one of them carrying this base.

3 The projection of the point (7 , 4) on the y-axis is the point .....

4 The two diagonals of an isosceles trapezium are .....

5 If the lengths of two adjacent sides in a parallelogram are 6 cm. , 7 cm. and its smaller height is 5 cm. , then its area is ..... cm^2.

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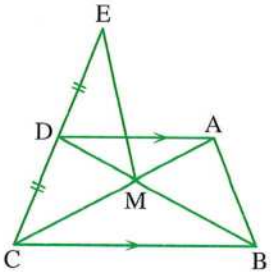
3 **[a] In the opposite figure :**

$\overline{AD} // \overline{BC}$

, D is the midpoint of $\overline{EC}$

Prove that :

The area of Δ ABM = the area of Δ DME



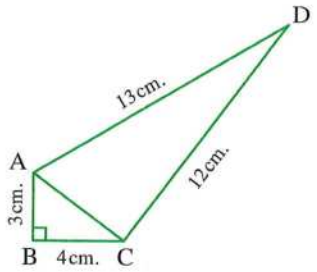
[b] In the opposite figure :

m ($\angle$ B) = 90°

, AB = 3 cm. , BC = 4 cm.

, AD = 13 cm. , DC = 12 cm.

Prove that : m ($\angle$ ACD) = 90°



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4 **[a]** Find the area of the trapezium with two parallel base lengths 8 cm. , 10 cm. and its height is 6 cm.

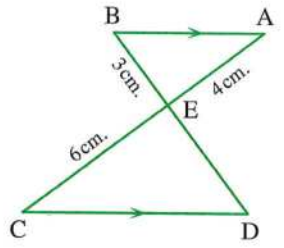
[b] In the opposite figure :

$\overline{AB} // \overline{CD}$, $\overline{AC} \cap \overline{BD} = \{E\}$

, AE = 4 cm. , BE = 3 cm. , CE = 6 cm.

1 **Prove that :** Δ ABE ~ Δ CDE

2 **Find :** The length of $\overline{ED}$



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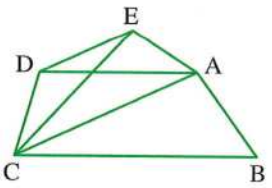
5 **[a] In the opposite figure :**

The area of the figure ABCD = the area of the figure ABCE

Prove that : $\overline{AC} // \overline{ED}$

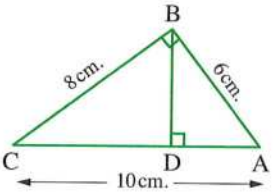


[b] In the opposite figure :

Δ ABC is right-angled at B , $\overline{BD} \perp \overline{AC}$

, AB = 6 cm. , BC = 8 cm. , AC = 10 cm.

Find : The length of each of $\overline{BD}$ and $\overline{CD}$



12 Suez Governorate

Directorate of Education
Inspection of Mathematics

Answer the following questions :

1 Choose the correct answer :

1 In ΔABC , if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle C$ is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

2 If $\overline{AB} \parallel \overleftrightarrow{XY}$, then the length of the projection of $\overline{AB}$ on $\overleftrightarrow{XY}$ ..... the length of $\overline{AB}$

(a) < (b) > (c) = (d) ≠

3 In ΔABC , if $(AB)^2 = (AC)^2 + (BC)^2$, $m(\angle B) = 50°$, then $m(\angle A)$ = ... °

(a) 50 (b) 40 (c) 90 (d) 130

4 If ABCD is a parallelogram , $m(\angle A) + m(\angle C) = 160°$, then $m(\angle B)$ = ... °

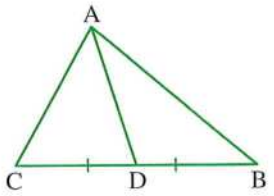
(a) 80 (b) 100 (c) 160 (d) 360

5 **In the opposite figure :**

ABC is a triangle , $\overline{AD}$ is a median ,

then the ratio between

the area of ΔADB : the area of ΔABC is .....



(a) 1 : 2 (b) 2 : 1 (c) 1 : 3 (d) 3 : 1

2 Complete :

1 If $\Delta ABC \sim \Delta XYZ$, $m(\angle A) + m(\angle B) = 80°$, then $m(\angle Z)$ = ... °

2 If the area of a square is 50 cm^2 , then the length of its diagonal is ..... cm.

3 If the two triangles are similar , then their corresponding sides are .....

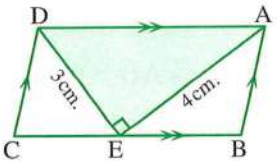
4 If $\overline{AB} \perp \overline{BC}$, then the projection of $\overline{AB}$ on $\overleftrightarrow{BC}$ is .....

5 The area of a triangle is equal to half of the area of a parallelogram , if they have a common base .....

3 [a] In the opposite figure :

ABCD is a parallelogram , AE = 4 cm.

, DE = 3 cm. , $m(\angle AED) = 90°$



Complete : 1 The area of ΔAED = ... cm^2

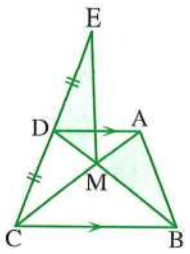
2 The area of the parallelogram ABCD = ... cm^2

[b] In the opposite figure :

$\overline{AD}$ // $\overline{BC}$

, D is the midpoint of $\overline{EC}$

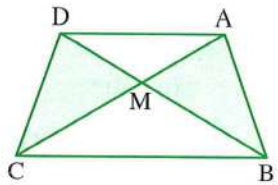
Prove that : The area of Δ AMB = the area of Δ DME



4 [a] In the opposite figure :

If the area of Δ AMB = the area of Δ DMC

, prove that : $\overline{AD}$ // $\overline{BC}$



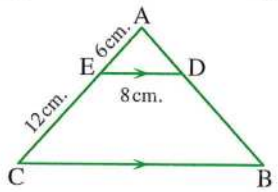
[b] In the opposite figure :

$\overline{ED}$ // $\overline{BC}$, ED = 8 cm. , AE = 6 cm.

, EC = 12 cm.

1 **Prove that :** Δ ADE ~ Δ ABC

2 **Find :** The length of $\overline{BC}$

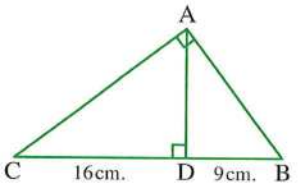


5 [a] In the opposite figure :

$\overline{AD} \perp \overline{BC}$, m (∠ BAC) = 90°

, DB = 9 cm. , DC = 16 cm.

Find : The length of each of $\overline{AB}$, $\overline{AD}$, $\overline{AC}$



[b] In the opposite figure :

m (∠ C) = 90° , $\overline{AE} \perp \overline{BD}$

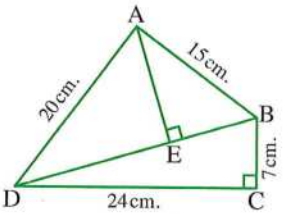
, BC = 7 cm. , CD = 24 cm.

, AB = 15 cm. , AD = 20 cm.

1 **Find :** The length of $\overline{BD}$

2 **Prove that :** m (∠ BAD) = 90°

3 **Find :** The length of $\overline{AE}$



13 Damietta Governorate — Math Supervision

Answer the following questions :

1 Choose the correct answer from those given :

1 The area of the rhombus whose diagonal lengths are 8 cm. and 10 cm. equals ..... cm^2

(a) 80 (b) 40 (c) 20 (d) 18

2 If the projection of a line segment on a straight line is a point , then the line segment ..... the straight line.

(a) // (b) $\perp$ (c) $\equiv$ (d) $\subset$

3 If the length of the base of a triangle is 6 cm. and its corresponding height is 3 cm. , then its area equals ..... cm^2.

(a) 18 (b) 9 (c) 6 (d) 2

4 A square whose diagonal length is 6 cm. , then its area equals ..... cm^2.

(a) 36 (b) 24 (c) 12 (d) 18

5 The two vertically opposite angles are .....

(a) complementary. (b) supplementary. (c) adjacent. (d) equal in measure.

2 Complete the following :

1 The area of the parallelogram = ... × its corresponding height.

2 If the ratio between two corresponding side lengths in two similar polygons is 3 : 4 , then the ratio between their perimeters is .....

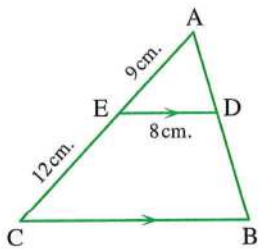
3 In Δ ABC , if $(AB)^2 = (AC)^2 + (BC)^2$, then m ($\angle$ .....) = 90°

4 If Δ ABC $\sim$ Δ DEF and m ($\angle$ C) = 70° , then m ($\angle$ F) = ...°

5 The number of diagonals of the quadrilateral equals .....

3 [a] In the opposite figure :

ABC is a triangle , $\overline{ED} // \overline{BC}$, AE = 9 cm. , EC = 12 cm. , ED = 8 cm.

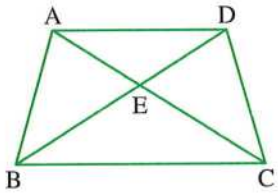


1 **Prove that :** Δ ABC $\sim$ Δ ADE

2 **Find :** The length of $\overline{BC}$

[b] In the opposite figure :

The area of Δ AEB = The area of Δ DEC

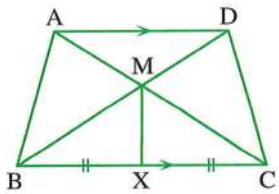


Prove that :

$\overline{AD} // \overline{BC}$

4 [a] In the opposite figure :

$\overline{AD} // \overline{BC}$, X is the midpoint of $\overline{BC}$



Prove that :

The area of the figure ABXM = The area of the figure DCXM

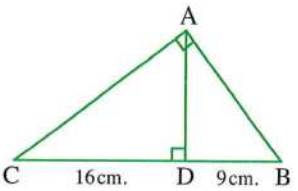
[b] ABCD is a trapezium in which $\overline{AD} // \overline{BC}$, if BC = 2 AD = 20 cm. and its area = 180 cm^2. , find its height.

5 **[a] In the opposite figure :**

ABC is a triangle , m (∠ BAC) = 90°

, $\overline{AD} \perp \overline{BC}$, BD = 9 cm. , DC = 16 cm.

Find : AD , AB , AC



[b] Determine the type of the triangle ABC according to its angles where AB = 7 cm. , BC = 6 cm. , AC = 9 cm.

14 El-Fayoum Governorate — Math Supervision

Answer the following questions :

1 **Choose the correct answer from the given ones :**

1 A rectangle its width is 6 cm. and its length is 8 cm. , then its diagonal length is ..... cm.

(a) 14 (b) 48 (c) 4 (d) 10

2 The diagonal length of a square = 8 cm. , then its area = ... cm^2

(a) 24 (b) 32 (c) 64 (d) 12

3 A circle its area = 16 π cm^2 , then its diameter length = ... cm.

(a) 7 (b) 16 (c) 32 (d) 8

4 ABC is an obtuse-angled triangle at B , then $(AC)^2$ ..... $(AB)^2 + (BC)^2$

(a) < (b) = (c) > (d) ≤

5 ABCD is a rectangle , then the projection of $\overline{AC}$ on $\overleftrightarrow{BC}$ is .....

(a) $\overline{AB}$ (b) $\overline{BC}$ (c) $\overline{CD}$ (d) $\overline{AD}$

2 **Complete the following :**

1 If two polygons are similar , then the corresponding side lengths are ..... and the corresponding angles are .....

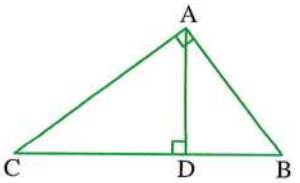
2 In the triangle ABC , if $(AB)^2 = (AC)^2 - (BC)^2$, then m (∠ .....) = 90°

3 Triangles with congruent bases on one straight line and have a common vertex are .....

4 The perimeter of a rhombus is 24 cm. and its area is 30 cm^2 , then its height is ..... cm.

5 **In the opposite figure :**

$(AC)^2$ = CD × .....



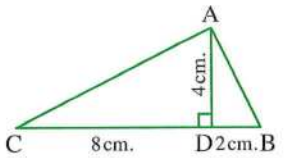
3 **[a] In the opposite figure :**

ABC is a triangle in which :

BD = 2 cm. , CD = 8 cm. , AD = 4 cm.

, $\overline{AD} \perp \overline{BC}$

Prove that : m ($\angle$ BAC) = 90°

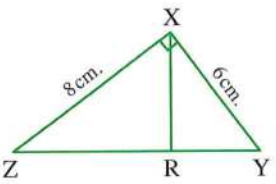


[b] In the opposite figure :

Δ XYZ is similar to Δ RYX , m ($\angle$ YXZ) = 90°

Prove that : $\overline{XR} \perp \overline{YZ}$ and if XY = 6 cm. , XZ = 8 cm.

, **find :** the length of $\overline{RZ}$



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4 **[a] In the opposite figure :**

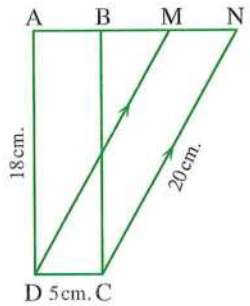
ABCD is a rectangle , M $\in \overleftrightarrow{AB}$, N $\in \overleftrightarrow{AB}$

, $\overline{CN} // \overline{DM}$, CD = 5 cm. , AD = 18 cm.

1 **Find :** The area of the figure MNCD

2 If CN = 20 cm.

, find the length of the perpendicular from M to $\overline{CN}$



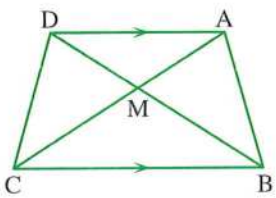
[b] In the opposite figure :

ABCD is a quadrilateral in which

$\overline{CB} // \overline{DA}$

Prove that :

The area of the triangle AMB = the area of the triangle DMC



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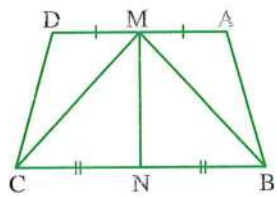
5 **[a] In the opposite figure :**

ABCD is a quadrilateral , AM = MD

, CN = NB

, the area of the figure ABNM = the area of the figure DCNM

Prove that : $\overline{CB} // \overline{DA}$



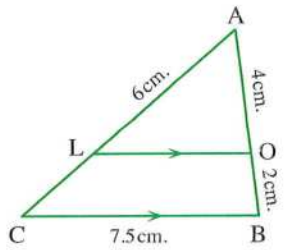
[b] In the opposite figure :

ABC is a triangle , $\overline{BC} // \overline{OL}$

, AO = 4 cm. , BO = 2 cm. , AL = 6 cm. , BC = 7.5 cm.

1 **Prove that :** Δ ABC is similar to Δ AOL

2 **Find :** The lengths of $\overline{LC}$ and $\overline{OL}$



15 Aswan Governorate

Kom Ombo Educational Directorate
Al-Qahmury Formal Language School

Answer the following questions :

1 Choose the correct answer :

1 The area of a rhombus whose two diagonal lengths are 6 cm. and 10 cm. is ..... cm^2.

(a) 60 (b) 30 (c) 15 (d) 10

2 The number of axes of symmetry of a square equals .....

(a) 1 (b) 2 (c) 3 (d) 4

3 All ..... are similar.

(a) squares. (b) triangles. (c) rectangles. (d) parallelograms

4 In ΔABC , if $(AB)^2 = (AC)^2 + (BC)^2 + 4$, then $\angle C$ is .....

(a) acute. (b) right. (c) obtuse. (d) straight.

5 The area of a triangle is 24 cm^2 and its height is 8 cm. , then the length of the corresponding base is ..... cm.

(a) 16 (b) 6 (c) 3 (d) 12

2 Complete the following :

1 In ΔABC , if $(AC - BC)(AC + BC) = (AB)^2$, then m ($\angle$ .....) = 90°

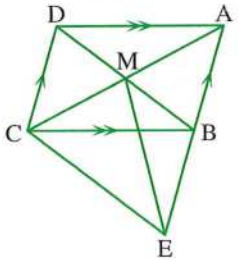
2 If $\overline{AB} \perp \overleftrightarrow{BC}$, then the length of the projection of $\overline{AC}$ on $\overleftrightarrow{BC}$ equals .....

3 If $\Delta ABC \sim \Delta XYZ$ and m ($\angle A$) + m ($\angle B$) = 60° , then m ($\angle Z$) = ...°

4 The diagonal length of the square whose area is 50 cm^2 equals ..... cm.

5 The area of the circle of diameter length 14 cm. is ..... cm^2 (Where $\pi = \frac{22}{7}$)

3 [a] In the opposite figure :



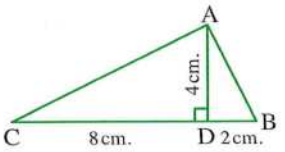
ABCD is a parallelogram

, $\overline{AC} \cap \overline{DB} = \{M\}$, $E \in \overrightarrow{AB}$

where the area of ΔAME = the area of ΔABC

Prove that : The figure BECD is a parallelogram.

[b] In the opposite figure :

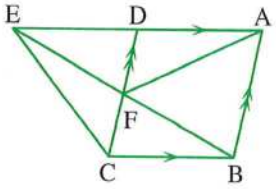


ABC is a triangle in which : BD = 2 cm.

, CD = 8 cm. , AD = 4 cm. , $\overline{AD} \perp \overline{BC}$

Prove that : m ($\angle BAC$) = 90°

4 **[a] In the opposite figure :**



ABCD is a parallelogram

, $E \in \overrightarrow{AD}$, $\overline{BE} \cap \overline{CD} = \{F\}$

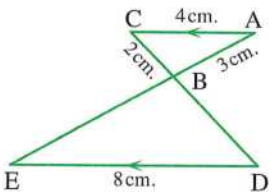
Prove that :

The area of the triangle AFD = the area of the triangle EFC

[b] Determine the type of the triangle XYZ according to its angles , where XY = 8 cm. , YZ = 11 cm. and XZ = 6 cm.

---

5 **[a] In the opposite figure :**



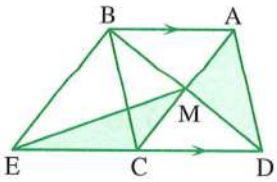
$\overline{AC} // \overline{DE}$, AC = 4 cm. , AB = 3 cm.

, CB = 2 cm. and DE = 8 cm.

1 **Prove that :** $\Delta ABC \sim \Delta EBD$

2 **Find :** The length of $\overline{BE}$

[b] In the opposite figure :



$\overline{AB} // \overline{CD}$, $\overline{AC} \cap \overline{BD} = \{M\}$

, the area of the triangle AMD = the area of the triangle MCE

Prove that : $\overline{MC} // \overline{BE}$

Answers of the schools examinations on Geometry

1 Cairo

1 [1] (a) [2] (b) [3] (a) [4] (a) [5] (c)

2 [1] equal [2] 120° [3] 28 [4] 6 [5] a right angle

3

[a] In Δ ABC :

∵ m (∠ BAC) = 90° , $\overline{AD} \perp \overline{BC}$

∴ $(AB)^2 = BD \times BC = 9 \times 25 = 225$

∴ AB = 15 cm.

, $(AC)^2 = CD \times CB = 16 \times 25 = 400$

∴ AC = 20 cm.

, $(AD)^2 = BD \times CD = 9 \times 16 = 144$

∴ AD = 12 cm. (The req.)

[b] ∵ The area of Δ AMB = the area of Δ CMD

Adding the area of Δ CMB to both sides

∴ The area of Δ ACB = the area of Δ DBC

and they have a common base $\overline{BC}$ and on one side of it

∴ $\overline{AD} // \overline{BC}$ (Q.E.D.)

4

[a] In ΔΔ ADE , CBE :

∵ $\overline{AD} // \overline{BC}$, $\overrightarrow{AC}$ is a transversal

∴ m (∠ A) = m (∠ C) (alternate angles) (1)

, ∵ $\overline{AD} // \overline{BC}$, $\overrightarrow{BD}$ is a transversal

∴ m (∠ D) = m (∠ B) (alternate angles) (2)

, ∵ m (∠ AED) = m (∠ CEB) (V.O.A.) (3)

From (1) , (2) and (3) :

∴ Δ ADE ~ Δ CBE (First req.)

∴ $\frac{AD}{CB} = \frac{DE}{BE} = \frac{AE}{CE}$ ∴ $\frac{4}{8} = \frac{2}{BE}$

∴ $BE = \frac{2 \times 8}{4} = 4$ cm. (Second req.)

[b] In Δ BAC :

∵ $(AC)^2 = (12)^2 = 144$

, $(AB)^2 + (BC)^2 = (7)^2 + (9)^2 = 130$

∴ $(AC)^2 > (AB)^2 + (BC)^2$

∴ Δ BAC is an obtuse-angled triangle. (The req.)

5

[a] ∵ Δ BFC , ▱ ABCD have the common base $\overline{BC}$

, ∵ F ∈ $\overline{AD}$

∴ The area of Δ BFC = $\frac{1}{2}$ the area of ▱ ABCD (1)

∵ $\overline{FB}$ is a median in Δ FEC

∴ The area of Δ BFC = $\frac{1}{2}$ the area of Δ FEC (2)

From (1) and (2) :

∴ The area of Δ FEC = The area of ▱ ABCD (Q.E.D.)

[b] In Δ ABC :

∵ m (∠ B) = 90°

∴ $(AC)^2 = (AB)^2 + (BC)^2 = (9)^2 + (12)^2 = 225$

∴ AC = 15 cm.

In Δ ADC :

∵ $(CD)^2 = (17)^2 = 289$

, $(AD)^2 + (AC)^2 = (8)^2 + (15)^2 = 289$

∴ $(CD)^2 = (AD)^2 + (AC)^2$

∴ m (∠ DAC) = 90° (Q.E.D.)

2 Cairo

1 [1] (b) [2] (b) [3] (a) [4] (c) [5] (c)

2 [1] equal [2] height [3] 25 [4] YZL [5] 180°

3

[a] ∵ ΔΔ ACD , BCD have a common base $\overline{CD}$

, $\overline{AB} // \overline{DC}$

∴ The area of Δ ACD = the area of Δ BCD

Subtracting the area of Δ MCD from both sides

∴ The area of Δ AMD = the area of Δ BMC (Q.E.D.)

[b] In Δ ABC :

∵ m (∠ B) = 90°

∴ $(AC)^2 = (AB)^2 + (BC)^2 = (12)^2 + (16)^2 = 400$

∴ AC = 20 cm. (First req.)

In Δ ACD :

$\because (CD)^2 = (25)^2 = 625$

, $(AD)^2 + (AC)^2 = (15)^2 + (20)^2 = 625$

$\therefore (CD)^2 = (AD)^2 + (AC)^2$

$\therefore$ m (∠ DAC) = 90°

$\therefore$ Δ ADC is a right-angled triangle. (Second req.)

4

[a] In Δ ABC :

$\because (AB)^2 = (7)^2 = 49$

, $(BC)^2 + (AC)^2 = (3)^2 + (6)^2 = 45$

$\therefore (AB)^2 > (BC)^2 + (AC)^2$

$\therefore$ Δ ABC is an obtuse-angled triangle.

(The req.)

[b] In ΔΔ ADE , ACB :

$\because$ m (∠ AED) = m (∠ B)

, ∠ A is a common angle

$\therefore$ m (∠ ADE) = m (∠ C)

$\therefore$ Δ ADE ~ Δ ACB (First req.)

, $\frac{AD}{AC} = \frac{DE}{CB} = \frac{AE}{AB}$ $\therefore \frac{3}{AC} = \frac{4.5}{9}$

$\therefore AC = \frac{3 \times 9}{4.5} = 6$ cm.

$\therefore EC = 6 - 4.5 = 1.5$ cm. (Second req.)

5

[a] The area $= \left(\frac{6+4}{2}\right) \times 5 = 25$ cm.²

[b] $\because \overline{AE}$ is a median in Δ ABC

$\therefore$ The area of Δ ABE = the area of Δ ACE (1)

, $\because$ DE is a median in Δ DBC

$\therefore$ The area of Δ DBE = the area of Δ DCE (2)

Subtracting (2) from (1) :

$\therefore$ The area of Δ ABD = the area of Δ ACD

(Q.E.D.)

3 Giza

1 [1] (a) [2] (a) [3] (a)
[4] (c) [5] (a)

2 [1] 5 [2] 48
[3] equal in area [4] 50 [5] 12

3

[a] In Δ ABC :

$\because (AC)^2 = (10)^2 = 100$

, $(AB)^2 + (BC)^2 = (6)^2 + (8)^2 = 100$

$\therefore (AC)^2 = (AB)^2 + (BC)^2$

$\therefore$ m (∠ B) = 90°

$\therefore$ ∠ B is right. (The req.)

[b] In Δ ABC :

$\because$ m (∠ BAC) = 90°

, $\overline{AD} \perp \overline{BC}$

$\therefore (AB)^2 = BD \times BC = 16 \times 25 = 400$

$\therefore AB = 20$ cm.

, $\because (AD)^2 = BD \times CD = 16 \times 9 = 144$

$\therefore AD = 12$ cm. (The req.)

4

[a] The area $= \left(\frac{4+6}{2}\right) \times 3 = 15$ cm.²

[b] In ΔΔ ABC , DBE :

$\because \overline{AC} // \overline{ED}$, $\overleftrightarrow{CE}$ is a transversal

$\therefore$ m (∠ C) = m (∠ E) (alternate angles) (1)

, $\because \overline{AC} // \overline{ED}$, $\overleftrightarrow{AD}$ is a transversal

$\therefore$ m (∠ A) = m (∠ D) (alternate angles) (2)

, $\because$ m (∠ CBA) = m (∠ EBD) (V.O.A.) (3)

From (1) , (2) and (3) :

$\therefore$ Δ ABC ~ Δ DBE (Q.E.D.)

5

[a] In Δ ABC :

$\because$ (∠ B) = 90°

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (3)^2 + (4)^2 = 25$

$\therefore AC = 5$ cm. (First req.)

In Δ ACD :

$\because (AD)^2 = (13)^2 = 169$

, $(AC)^2 + (CD)^2 = (5)^2 + (12)^2 = 169$

$\therefore (AD)^2 = (AC)^2 + (CD)^2$

$\therefore$ m (∠ ACD) = 90° (Second req.)

[b] In ΔΔ ACB , DCB have a common base $\overline{BC}$

, $\overline{DA} // \overline{CB}$

$\therefore$ The area of Δ ACB = the area of Δ DCB

Subtracting the area of Δ ECB from both sides

∴ The area of Δ AEB = The area of Δ DEC

(Q.E.D.)

4 Giza

1 [1] (b) [2] (b) [3] (a)
[4] (d) [5] (c)

2 [1] proportional , equal in measure [2] 120°
[3] > [4] 50 [5] 30 cm.

3

[a] In Δ ABD :

∵ $\overline{DB} \perp \overline{AB}$

∴ m (∠ ABD) = 90°

∴ $(BD)^2 = (AD)^2 - (AB)^2 = (17)^2 - (8)^2 = 225$

∴ BD = 15 cm. (First req.)

In Δ BCD :

∵ $(BD)^2 = (15)^2 = 225$

, $(BC)^2 + (CD)^2 = (9)^2 + (12)^2 = 225$

∴ $(BD)^2 = (BC)^2 + (CD)^2$

∴ m (∠ C) = 90° (Second req.)

[b] In Δ ABC :

∵ $(AC)^2 = (7)^2 = 49$

, $(AB)^2 + (BC)^2 = (5)^2 + (6)^2 = 61$

∴ $(AC)^2 < (AB)^2 + (BC)^2$

∴ Δ ABC is an acute-angled triangle. (The req.)

4

[a] In ΔΔ ABC , DBE :

∵ $\overline{AC} // \overline{ED}$, $\overleftrightarrow{AD}$ is a transversal

∴ m (∠ A) = m (∠ D) (alternate angles) (1)

, ∵ $\overline{AC} // \overline{ED}$, $\overleftrightarrow{CE}$ is a transversal

∴ m (∠ C) = m (∠ E) (alternate angles) (2)

, ∵ m (∠ ABC) = m (∠ DBE) (V.O.A.) (3)

From (1) , (2) and (3) :

∴ Δ ABC ~ Δ DBE (First req.)

, $\frac{AB}{DB} = \frac{BC}{BE} = \frac{AC}{DE}$ ∴ $\frac{3}{6} = \frac{5}{DE}$

∴ $DE = \frac{5 \times 6}{3} = 10$ cm.

∴ The perimeter of Δ BED = 8 + 10 + 6 = 24 cm.

(Second req.)

[b] ∵ The area of Δ ADC = the area of Δ AEB

Subtracting the area of Δ ADE from both sides

∴ The area of Δ CED = the area of Δ BDE

and they have a common base $\overline{DE}$ and on one side of it.

∴ $\overline{DE} // \overline{BC}$ (Q.E.D.)

5

[a] ∵ ΔΔ ACD , BCD have a common base $\overline{CD}$

, $\overline{AB} // \overline{CD}$

∴ The area of Δ ACD = the area of Δ BCD (1)

, ∵ $\overline{ME}$ is a median in Δ CMD

∴ The area of Δ EMC = the area of Δ EMD (2)

Subtracting (2) from (1) :

∴ The area of the figure ADEM
= the area of the figure BCEM (Q.E.D)

[b] In Δ ABC :

∵ m (∠ BAC) = 90°

, $\overline{AD} \perp \overline{BC}$

∴ $(AD)^2 = BD \times CD = 4.5 \times 8 = 36$

∴ AD = 6 cm.

, $(AB)^2 = BD \times BC = 4.5 \times 12.5 = 56.25$

∴ AB = 7.5 cm.

, $(AC)^2 = CD \times BC = 8 \times 12.5 = 100$

∴ AC = 10 cm. (The req.)

5 Alexandria

1 [1] (a) [2] (a) [3] (c)
[4] (d) [5] (a)

2 [1] 24 [2] equal in measure
[3] 16
[4] parallelogram [5] 42

3

[a] In Δ XYZ :

∵ $(YZ)^2 = (7)^2 = 49$

, $(XY)^2 + (XZ)^2 = (4)^2 + (5)^2 = 41$

, ∵ $(YZ)^2 > (XY)^2 + (XZ)^2$

∴ ∠ X is obtuse. (The req.)

[b] The area = 50 × 24 = 1200 cm^2.

4

[a] In Δ XYZ :

$\because$ m (∠ XYZ) = 90° , $\overline{YL} \perp \overline{XZ}$

$\therefore (XZ)^2 = (XY)^2 + (YZ)^2 = (20)^2 + (15)^2 = 625$

$\therefore$ XZ = 25 cm. (First req.)

, $YL = \frac{YX \times YZ}{XZ} = \frac{20 \times 15}{25} = 12$ cm. (Second req.)

[b] $\because$ ΔΔ BAD , CAD have the same base $\overline{AD}$

, $\overline{AD} // \overline{BC}$

$\therefore$ The area of Δ BAD = the area of Δ CAD

Subtracting the area of Δ MAD from both sides

$\therefore$ The area of Δ BMA = the area of Δ CMD (1)

, $\because$ ΔΔ MAX , MDY have equal bases in length and on one straight line and they are common in the vertex M

$\therefore$ The area of Δ MAX = the area of Δ MDY (2)

Adding (1) and (2) :

$\therefore$ The area of the figure ABMX = the area of the figure DCMY (Q.E.D.)

5

[a] In ΔΔ ABC , AED :

$\because$ m (∠ B) = m (∠ E) = 90°

, m (∠ BAC) = m (∠ EAD) (V.O.A.)

$\therefore$ m (∠ C) = m (∠ D)

$\therefore$ Δ ABC ~ Δ AED (First req.)

$\therefore \frac{AB}{AE} = \frac{BC}{ED} = \frac{AC}{AD}$ $\therefore \frac{12}{3} = \frac{AB}{4}$

$\therefore AB = \frac{4 \times 12}{3} = 16$ cm.

$\therefore$ BE = 4 + 16 = 20 cm. (Second req.)

[b] The area = $\frac{1}{2} \times 8 \times 10 = 40$ cm^2

6 El-Kalyoubia

1 [1] (b) [2] (b) [3] (c)
[4] (c) [5] (b)

2 [1] 120° [2] proportional
[3] 24 [4] equal in area
[5] congruent

3

[a] The length of the middle base = $\frac{1}{2}$ (8 + 10) = 9 cm.

, the area of the trapezium = 9 × 5 = 45 cm^2

[b] $\because$ ΔΔ ABC , DBC have a common base $\overline{BC}$

, $\overline{AD} // \overline{BC}$

$\therefore$ The area of Δ ABC = the area of Δ DBC

Subtracting the area of Δ MBC from both sides

$\therefore$ The area of Δ AMB = the area of Δ DMC (1)

, $\because$ $\overline{MX}$ is a median in Δ MBC

$\therefore$ The area of Δ BMX = the area of Δ CMX (2)

Adding (1) and (2) :

$\therefore$ The area of the figure ABXM = the area of the figure DCXM (Q.E.D.)

4

[a] In Δ ABC :

$\because$ m (∠ BAC) = 90° , $\overline{AD} \perp \overline{BC}$

$\therefore (AD)^2 = DB \times DC = 9 \times 16 = 144$

$\therefore$ AD = 12 cm.

, $(AB)^2 = BD \times BC = 9 \times 25 = 225$

$\therefore$ AB = 15 cm.

, $(AC)^2 = CD \times BC = 16 \times 25 = 400$

$\therefore$ AC = 20 cm. (The req.)

[b] In ΔΔ ABC , DBE

$\because$ $\overline{AC} // \overline{ED}$, $\overrightarrow{AD}$ is a transversal

$\therefore$ m (∠ A) = m (∠ D) (alternate angles) (1)

, $\because$ $\overline{AC} // \overline{ED}$, $\overleftrightarrow{CE}$ is a transversal

$\therefore$ m (∠ C) = m (∠ E) (alternate angles) (2)

, $\because$ m (∠ ABC) = m (∠ DBE) (V.O.A.) (3)

From (1) , (2) and (3) :

$\therefore$ Δ ABC ~ Δ DBE (First req.)

, $\frac{AB}{DB} = \frac{BC}{BE} = \frac{AC}{DE}$ $\therefore \frac{AB}{18} = \frac{5}{15} = \frac{3}{DE}$

$\therefore AB = \frac{18 \times 5}{15} = 6$ cm.

, $DE = \frac{3 \times 15}{5} = 9$ cm. (Second req.)

5

[a] In Δ ABC :

$\because$ m (∠ B) = 90°

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (3)^2 + (4)^2 = 25$

$\therefore$ AC = 5 cm. (First req.)

In Δ ACD :

$\because (CD)^2 = (13)^2 = 169$

, $(AD)^2 + (AC)^2 = (12)^2 + (5)^2 = 169$

, $\because (CD)^2 = (AD)^2 + (AC)^2$

$\therefore$ m (∠ DAC) = 90° (Second req.)

[b] ∵ The area of Δ ABE = the area of Δ ACD

Subtracting the area of Δ ADE from both sides

∴ The area of Δ BED = the area of Δ CDE

and they have a common base $\overline{ED}$ and on one side of it

∴ $\overline{DE} // \overline{BC}$ (Q.E.D.)

7 El-Sharkia

1 [1] 5 [2] C

[3] base length [4] X [5] equal

2 [1] (c) [2] (d) [3] (c)

[4] (b) [5] (b)

3

[a] ∵ ΔΔ LYZ , XYZ have the common base $\overline{YZ}$

, $\overline{XL} // \overline{YZ}$

∴ The area of Δ LYZ = the area of Δ XYZ

Subtracting the area of Δ MYZ from both sides.

∴ The area of Δ ZML = the area of Δ YMX

(Q.E.D.)

[b] In ΔΔ ADE , ACB :

∵ m (∠ AED) = m (∠ B)

, ∠ A is a common angle

∴ m (∠ ADE) = m (∠ C)

∴ Δ ADE ~ Δ ACB (First req.)

, $\frac{AD}{AC} = \frac{DE}{CB} = \frac{AE}{AB}$ ∴ $\frac{3}{AC} = \frac{4.5}{9}$

∴ $AC = \frac{3 \times 9}{4.5} = 6$ cm.

∴ EC = 6 – 4.5 = 1.5 cm. (Second req.)

4

[a] In Δ ABC :

∵ m (∠ BAC) = 90° , $\overline{AD} \perp \overline{BC}$

∴ $(AC)^2 = CD \times BC = 4.5 \times 12.5 = 56.25$

∴ AC = 7.5 cm. (First req.)

, $(AD)^2 = CD \times BD = 4.5 \times 8 = 36$

∴ AD = 6 cm.

∴ The area of Δ ABC = $\frac{1}{2} \times 12.5 \times 6 = 37.5$ cm^2

(Second req.)

[b] In Δ ABD :

∵ m (∠ ABD) = 90°

∴ $(BD)^2 = (AD)^2 - (AB)^2 = (17)^2 - (8)^2 = 225$

∴ BD = 15 cm. (First req.)

In Δ BCD :

∵ $(BD)^2 = (15)^2 = 225$

, $(BC)^2 + (CD)^2 = (9)^2 + (12)^2 = 225$

∴ $(BD)^2 = (BC)^2 + (CD)^2$

∴ m (∠ C) = 90° (Second req.)

5

[a] The area of the parallelogram = 7 × 4 = 28 cm^2

the greater height = 28 ÷ 5 = 5.6 cm.

[b] In Δ XYZ :

∵ $(YZ)^2 = (13)^2 = 169$

, $(XY)^2 + (XZ)^2 = (12)^2 + (4)^2 = 160$

∴ $(YZ)^2 > (XY)^2 + (XZ)^2$

∴ Δ XYZ is an obtuse-angled triangle. (The req.)

8 El-Monofia

1 [1] 10 cm. [2] equal in area

[3] A

[4] a common base lying on one of two parallel straight lines including them.

[5] a right-angled triangle.

2 [1] (b) [2] (b) [3] (a)

[4] (a) [5] (a)

3

[a] ∵ Δ BFC , ▱ ABCD have the common base $\overline{BC}$

, ∵ F ∈ $\overline{AD}$

∴ The area of Δ BFC = $\frac{1}{2}$ the area of ▱ ABCD (1)

∵ $\overline{FB}$ is a median in Δ FEC

∴ The area of Δ BFC = $\frac{1}{2}$ the area of Δ FEC (2)

From (1) and (2) :

∴ The area of Δ FEC = the area of ▱ ABCD

(Q.E.D.)

[b] ∵ $\overline{CM}$ is a median in Δ CDE

∴ The area of Δ CMD = the area of Δ CME

, ∵ the area of Δ AMB = the area of Δ CME

∴ The area of Δ AMB = the area of Δ CMD

Adding the area of Δ ADM to both sides

∴ The area of Δ ABD = the area of Δ ACD

and they have a common base $\overline{AD}$ and on one side of it.

∴ $\overline{AD} // \overline{BC}$ (Q.E.D.)

4

[a] ∵ The area of the rhombus = $\frac{1}{2} \times 18 \times 24 = 216$ m^2.

∴ The area of the trapezium = 216 m^2.

∴ The length of the middle base = 216 ÷ 12 = 18 m.

[b] ∵ The figure ABCD ~ the figure XYZL

∴ m (∠ D) = m (∠ L) = 80°

From the figure ABCD :

∴ m (∠ BCD) = 360° − (125° + 70° + 80°) = 85° (First req.)

∴ $\frac{AD}{XL} = \frac{BC}{YZ}$ ∴ $\frac{6}{XL} = \frac{8}{2.4}$

∴ XL = $\frac{6 \times 2.4}{8}$ = 1.8 cm. (Second req.)

, ∵ $\frac{\text{the perimeter of the figure ABCD}}{\text{the perimeter of the figure XYZL}} = \frac{BC}{YZ}$

∴ $\frac{26}{\text{The perimeter of the figure XYZL}} = \frac{8}{2.4}$

∴ The perimeter of the figure XYZL

= $\frac{26 \times 2.4}{8}$ = 7.8 cm. (Third req.)

5

[a] ∵ Δ ABD is right-angled at B

∴ $(BD)^2 = (AD)^2 - (AB)^2 = (10)^2 - (6)^2 = 64$

∴ BD = 8 cm.

∴ The area of ▱ ABCD = AB × BD = 6 × 8

= 48 cm^2. (First req.)

∵ $\overline{AB} // \overline{DC}$ (Properties of parallelogram)

, $\overleftrightarrow{BD}$ is a transversal.

∴ m (∠ ABD) = m (∠ CDB) (alternate angles)

∴ m (∠ CDB) = 90°

∵ AB = DC , AD = BC

(properties of parallelogram)

∴ DC = 6 cm. , BC = 10 cm.

∵ $\overline{BE}$ is the projection of $\overline{DB}$ on $\overleftrightarrow{BC}$

, ∵ Δ DBC is right-angled at D , $\overline{DE} \perp \overline{BC}$

∴ $(BD)^2 = BE \times BC$ ∴ $64 = BE \times 10$

∴ BE = $\frac{64}{10}$ = 6.4 cm. (Second req.)

, DE = $\frac{DB \times DC}{BC} = \frac{8 \times 6}{10}$ = 4.8 cm. (Third req.)

[b] In ΔΔ ADE , ABC :

∵ $\overline{DE} // \overline{BC}$, $\overleftrightarrow{AB}$ is a transversal

∴ m (∠ ADE) = m (∠ B) (corresponding angles) (1)

, ∵ $\overline{DE} // \overline{BC}$, $\overleftrightarrow{AC}$ is a transversal

∴ m (∠ AED) = m (∠ C) (corresponding angles) (2)

, ∵ ∠ A is a common angle (3)

From (1) , (2) and (3) :

∴ Δ ADE ~ Δ ABC (First req.)

, $\frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC}$ ∴ $\frac{3}{5} = \frac{DE}{6} = \frac{AE}{4}$

∴ DE = $\frac{3 \times 6}{5}$ = 3.6 cm.

, AE = $\frac{3 \times 4}{5}$ = 2.4 cm. (Second req.)

9 El-Gharbia

1 [1] 10 cm. [2] similar

[3] acute-angled [4] a point [5] 135°

2 [1] (d) [2] (b) [3] (b)

[4] (d) [5] (d)

3

[a] ∵ The area of Δ AMB = the area of Δ DMC

Adding the area of Δ AMD to both sides

∴ The area of Δ ABD = the area of Δ ACD

but they have a common base $\overline{AD}$ and on one side of it

∴ $\overline{AD} // \overline{BC}$ (Q.E.D.)

[b] In ΔΔ AED , ABC :

∵ $\overline{ED} // \overline{BC}$, $\overleftrightarrow{AB}$ is a transversal

∴ m (∠ AED) = m (∠ B) (corresponding angles) (1)

, ∵ $\overline{ED} // \overline{BC}$, $\overleftrightarrow{AC}$ is a transversal

∴ m (∠ ADE) = m (∠ C) (corresponding angles) (2)

, ∵ ∠ A is a common angle (3)

From (1) , (2) and (3) :

∴ Δ AED ~ Δ ABC :

, $\frac{AE}{AB} = \frac{ED}{BC} = \frac{AD}{AC}$ $\therefore \frac{5}{15} = \frac{4}{AC}$

$\therefore AC = \frac{4 \times 15}{5} = 12$ cm.

$\therefore DC = 12 - 4 = 8$ cm. (The req.)

4

[a] In ΔABC : $\because m(\angle BAC) = 90°$, $\overline{AD} \perp \overline{BC}$

$\therefore (AB)^2 = BD \times BC = 16 \times 25 = 400$

$\therefore AB = 20$ cm.

, $(AC)^2 = CD \times BC = 9 \times 25 = 225$

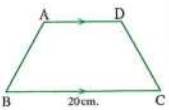
$\therefore AC = 15$ cm.

, $(AD)^2 = CD \times BD = 9 \times 16 = 144$

$\therefore AD = 12$ cm. (The req.)

[b] $\because BC = 2\,AD = 20$ cm.

$\therefore AD = 10$ cm.



, $\because$ the area of the trapezium ABCD $= \frac{1}{2}(BC + AD) \times$ the height

$\therefore 180 = \frac{1}{2}(20 + 10) \times$ the height

$\therefore 180 = 15 \times$ the height

$\therefore$ The height $= \frac{180}{15} = 12$ cm. (The req.)

5

[a] $\because \overline{AO} \perp \overleftrightarrow{BC}$

$\therefore$ The area of $\Delta ABC = \frac{1}{2} \times BC \times AO$

$= \frac{1}{2} \times 7 \times 5 = 17.5$ cm^2.

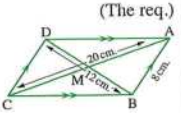
, $\because \overline{BE} \perp \overline{AC}$

$\therefore$ The area of $\Delta ABC = \frac{1}{2} \times AC \times BE = 17.5$

$\therefore \frac{1}{2} \times 10 \times BE = 17.5$ $\therefore 5\,BE = 17.5$

$\therefore BE = \frac{17.5}{5} = 3.5$ cm. (The req.)

[b] Let $\overline{AC} \cap \overline{BD} = \{M\}$



$\therefore AM = 10$ cm.

, $BM = 6$ cm.

$\therefore$ In ΔABM : $(AM)^2 = (10)^2 = 100$

, $(AB)^2 + (BM)^2 = (8)^2 + (6)^2 = 100$

$\therefore (AM)^2 = (AB)^2 + (BM)^2$

$\therefore \Delta ABM$ is right-angled at B

$\therefore m(\angle ABD) = 90°$ (First req.)

$\therefore$ The area of $\square ABCD$

$= AB \times BD = 8 \times 12 = 96$ cm^2. (Second req.)

10 El-Dakahlia

1 [1] (a) [2] (b) [3] (c)
[4] (a) [5] (c)

2 [1] congruent [2] 6 [3] >
[4] 80° [5] an obtuse-angled

3

[a] $\because \Delta EBC$, $\square ABCD$ have a common base $\overline{BC}$

, $E \in \overline{AD}$

$\therefore$ The area of $\Delta EBC = \frac{1}{2}$ the area of $\square ABCD$

but the area of $\square ABCD$ = the area of $\parallel$gm ABYX

(have a common base $\overline{AB}$ and between two parallel straight lines $\overleftrightarrow{AB}$, $\overleftrightarrow{CX}$)

$\therefore$ The area of $\Delta EBC = \frac{1}{2}$ the area of $\parallel$gm ABYX

(Q.E.D.)

[b] In ΔABC :

$\because m(\angle B) = 90°$

$\therefore (AC)^2 = (AB)^2 + (BC)^2 = (3)^2 + (4)^2 = 25$

$\therefore AC = 5$ cm.

In ΔACD :

$\because (AD)^2 = (13)^2 = 169$

, $(AC)^2 + (CD)^2 = (5)^2 + (12)^2 = 169$

, $\because (AD)^2 = (AC)^2 + (CD)^2$

$\therefore m(\angle ACD) = 90°$ (Q.E.D.)

4

[a] In $\Delta\Delta AXY$, ABC :

$\because \overline{XY} \parallel \overline{BC}$, $\overleftrightarrow{AB}$ is a transversal

$\therefore m(\angle AXY) = m(\angle B)$ (corresponding angles) (1)

, $\because \overline{XY} \parallel \overline{BC}$, $\overleftrightarrow{AC}$ is a transversal

$\therefore m(\angle AYX) = m(\angle C)$ (corresponding angles) (2)

, $\because \angle A$ is a common angle (3)

From (1) , (2) and (3) :

$\therefore \Delta AXY \sim \Delta ABC$ (First req.)

, $\frac{AX}{AB} = \frac{XY}{BC} = \frac{AY}{AC}$ $\therefore \frac{8}{12} = \frac{6}{BC}$

$\therefore BC = \frac{6 \times 12}{8} = 9$ cm. (Second req.)

[b] ∵ The area of Δ ACD = the area of Δ ABE

Subtracting the area of Δ ADE from both sides

∴ The area of Δ CED = the area of Δ BDE

and they have a common base $\overline{DE}$ and on one side of it

∴ $\overline{DE} // \overline{BC}$ (Q.E.D.)

5

[a] In Δ ABC :

∵ m (∠ BAC) = 90° , $\overline{AD} \perp \overline{BC}$

∴ $(AB)^2 = BD \times BC = 9 \times 25 = 225$

∴ AB = 15 cm.

, $(AD)^2 = DB \times DC = 9 \times 16 = 144$

∴ AD = 12 cm. (The req.)

[b] The area = $\left(\frac{8+10}{2}\right) \times 6 = 54$ cm.^{2}

11 Ismailia

1 [1] (b) [2] (c) [3] (b) [4] (b) [5] (b)

2 [1] 90° [2] double [3] (0 , 4) [4] equal in length [5] 35

3

[a] ∵ ΔΔ ADB , ADC have the same base $\overline{AD}$

, $\overline{BC} // \overline{AD}$

∴ The area of Δ ADB = the area of Δ ADC

Subtracting the area of Δ AMD from both sides

∴ The area of Δ ABM = the area of Δ DMC (1)

, ∵ $\overline{MD}$ is a median in Δ EMC

∴ The area of Δ DME = the area of Δ DMC (2)

From (1) and (2) :

∴ The area of Δ ABM = the area of Δ DME

(Q.E.D.)

[b] In Δ ABC : ∵ m (∠ B) = 90°

∴ $(AC)^2 = (AB)^2 + (BC)^2 = (3)^2 + (4)^2 = 25$

∴ AC = 5 cm.

, in Δ ACD :

∵ $(AD)^2 = (13)^2 = 169$

, $(AC)^2 + (CD)^2 = (5)^2 + (12)^2 = 169$

∴ $(AD)^2 = (AC)^2 + (CD)^2$

∴ m (∠ ACD) = 90° (Q.E.D.)

4

[a] The area = $\left(\frac{8+10}{2}\right) \times 6 = 54$ cm.^{2}

[b] In ΔΔ ABE , CDE :

∵ $\overline{AB} // \overline{CD}$, $\overleftrightarrow{AC}$ is a transversal

∴ m (∠ A) = m (∠ C) (alternate angles) (1)

, ∵ $\overline{AB} // \overline{CD}$, $\overleftrightarrow{BD}$ is a transversal

∴ m (∠ B) = m (∠ D) (alternate angles) (2)

, m (∠ AEB) = m (∠ DEC) (V.O.A.) (3)

From (1) , (2) and (3) :

∴ Δ ABE ~ Δ CDE (First req.)

, $\frac{AB}{CD} = \frac{BE}{DE} = \frac{AE}{CE}$ ∴ $\frac{3}{DE} = \frac{4}{6}$

∴ DE = $\frac{3 \times 6}{4} = 4.5$ cm. (Second req.)

5

[a] ∵ The area of the figure ABCD = the area of the figure ABCE

Subtracting the area of Δ ABC from both sides

∴ The area of Δ ACD = the area of Δ ACE

and they have a common base $\overline{AC}$ and on one side of it

∴ $\overline{AC} // \overline{ED}$ (Q.E.D.)

[b] In Δ ABC :

∵ m (∠ ABC) = 90° , $\overline{BD} \perp \overline{AC}$

∴ BD = $\frac{BA \times BC}{AC} = \frac{6 \times 8}{10} = 4.8$ cm.

, ∵ $(BC)^2 = CD \times AC$

∴ $(8)^2 = CD \times 10$

∴ CD = $\frac{64}{10} = 6.4$ cm. (The req.)

12 Suez

1 [1] (c) [2] (c) [3] (b) [4] (b) [5] (a)

2 [1] 100° [2] 10 [3] proportional [4] B [5] lying on one of two parallel straight lines including them.

3

[a] [1] 6 [2] 12

[b] ∵ ΔΔ ADB , ADC have the same base $\overline{AD}$

, $\overline{AD} // \overline{BC}$

∴ The area of Δ ADB = the area of Δ ADC

Subtracting the area of Δ AMD from both sides

∴ The area of Δ AMB = the area of Δ DMC (1)

, ∵ $\overline{MD}$ is a median in Δ EMC

∴ The area of Δ MDE = the area of Δ DMC (2)

From (1) and (2) :

∴ The area of Δ AMB = the area of Δ DME

(Q.E.D.)

4

[a] ∵ The area of Δ AMB = the area of Δ DMC

Adding the area of Δ DMA to both sides

∴ The area of Δ ABD = the area of Δ ACD

and they have a common base $\overline{AD}$ and on one side of it

∴ $\overline{AD} // \overline{BC}$ (Q.E.D.)

[b] In ΔΔ ADE , ABC :

∵ $\overline{ED} // \overline{BC}$, $\overleftrightarrow{AB}$ is a transversal

∴ m (∠ ADE) = m (∠ B) (corresponding angles) (1)

, ∵ $\overline{ED} // \overline{BC}$, $\overleftrightarrow{AC}$ is a transversal

∴ m (∠ AED) = m (∠ C) (corresponding angles) (2)

, ∵ ∠ A is a common angle (3)

From (1) , (2) and (3) :

∴ Δ ADE ~ Δ ABC (First req.)

, $\frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC}$ ∴ $\frac{8}{BC} = \frac{6}{18}$

∴ BC = $\frac{18 \times 8}{6}$ = 24 cm. (Second req.)

5

[a] In Δ ABC :

∵ m (∠ BAC) = 90° , $\overline{AD} \perp \overline{BC}$

∴ $(AB)^2$ = BD × BC = 9 × 25 = 225

∴ AB = 15 cm.

, $(AD)^2$ = DB × DC = 9 × 16 = 144

∴ AD = 12 cm.

, $(AC)^2$ = CD × CB = 16 × 25 = 400

∴ AC = 20 cm. (The req.)

[b] In Δ BCD :

∵ m (∠ C) = 90°

∴ $(BD)^2 = (BC)^2 + (CD)^2 = (7)^2 + (24)^2 = 625$

∴ BD = 25 cm. (First req.)

, in Δ ABD :

∵ $(BD)^2 = (25)^2 = 625$

, $(AB)^2 + (AD)^2 = (15)^2 + (20)^2 = 625$

∴ $(BD)^2 = (AB)^2 + (AD)^2$

∴ m (∠ BAD) = 90° (Second req.)

, ∵ $\overline{AE} \perp \overline{BD}$

∴ AE = $\frac{AB \times AD}{BD} = \frac{15 \times 20}{25}$ = 12 cm. (Third req.)

13 Damietta

1 [1] (b) [2] (b) [3] (b) [4] (d) [5] (d)

2 [1] the base length [2] 3 : 4 [3] C [4] 70° [5] 2

3

[a] In ΔΔ ABC , ADE :

∵ $\overline{ED} // \overline{BC}$, $\overleftrightarrow{AB}$ is a transversal

∴ m (∠ B) = m (∠ ADE) (corresponding angles) (1)

, ∵ $\overline{ED} // \overline{BC}$, $\overleftrightarrow{AC}$ is a transversal

∴ m (∠ C) = m (∠ AED) (corresponding angles) (2)

, ∠ A is a common angle (3)

From (1) , (2) and (3) :

∴ Δ ABC ~ Δ ADE (First req.)

, $\frac{AB}{AD} = \frac{BC}{DE} = \frac{AC}{AE}$ ∴ $\frac{BC}{8} = \frac{21}{9}$

∴ BC = $\frac{8 \times 21}{9} = 18\frac{2}{3}$ cm. (Second req.)

[b] ∵ The area of Δ AEB = The area of Δ DEC

Adding the area of Δ AED to both sides

∴ The area of Δ ABD = the area of Δ ACD

and they have a common base $\overline{AD}$ and on one side of it.

∴ $\overline{AD} // \overline{BC}$ (Q.E.D.)

4

[a] ∵ ΔΔ ABC , DBC have a common base $\overline{BC}$

, $\overline{AD} // \overline{BC}$

∴ The area of Δ ABC = the area of Δ DBC

Subtracting the area of Δ MBC from both sides.

∴ The area of Δ ABM = the area of Δ DCM (1)

, ∵ $\overline{MX}$ is a median in the Δ MBC

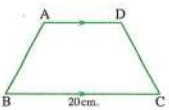
∴ The area of Δ BMX = the area of Δ CMX (2)

Adding (1) and (2) :

∴ The area of the figure ABXM = the area of the figure DCXM (Q.E.D.)

[b] ∵ BC = 2 AD = 20 cm.

∴ AD = 10 cm.



, ∵ the area of the trapezium ABCD $= \frac{1}{2}$ (BC + AD) × the height

∴ $180 = \frac{1}{2}$ (20 + 10) × the height

∴ 180 = 15 × the height

∴ The height $= \frac{180}{15} = 12$ cm. (The req.)

5

[a] In Δ ABC :

∵ m (∠ BAC) = 90°

, $\overline{AD} \perp \overline{BC}$

∴ $(AD)^2 = DB \times DC = 9 \times 16 = 144$

∴ AD = 12 cm.

, $(AB)^2 = BD \times BC = 9 \times 25 = 225$

∴ AB = 15 cm.

, $(AC)^2 = CD \times BC = 16 \times 25 = 400$

∴ AC = 20 cm. (The req.)

[b] In Δ ABC :

∵ $(AC)^2 = (9)^2 = 81$

, $(AB)^2 + (BC)^2 = (7)^2 + (6)^2 = 85$

∴ $(AC)^2 < (AB)^2 + (BC)^2$

∴ Δ ABC is an acute-angled triangle. (The req.)

14 El-Fayoum

1 [1] (d) [2] (b) [3] (d)
[4] (c) [5] (b)

2 [1] proportional , equal in measure
[2] B
[3] equal in area [4] 5 [5] BC

3

[a] ∵ Δ ADC is right-angled at D

∴ $(AC)^2 = (AD)^2 + (DC)^2 = (4)^2 + (8)^2 = 80$

, ∵ Δ ADB is a right-angled at D

∴ $(AB)^2 = (AD)^2 + (BD)^2 = (4)^2 + (2)^2 = 20$

In Δ ABC :

∵ $(AC)^2 + (AB)^2 = 80 + 20 = 100$

, $(BC)^2 = (10)^2 = 100$

∴ $(BC)^2 = (AC)^2 + (AB)^2$

∴ m (∠ BAC) = 90° (Q.E.D.)

[b] ∵ Δ XYZ ~ Δ RYX

∴ m (∠ YXZ) = m (∠ YRX) = 90°

∴ $\overline{XR} \perp \overline{YZ}$ (First req.)

In Δ XYZ : ∵ m (∠ YXZ) = 90°

∴ $(YZ)^2 = (XY)^2 + (XZ)^2 = 6^2 + 8^2 = 100$

∴ YZ = 10 cm. , ∵ $\overline{XR} \perp \overline{YZ}$

, $(XZ)^2 = RZ \times YZ$

∴ $8^2 = RZ \times 10$

∴ $RZ = \frac{64}{10} = 6.4$ (Second req.)

4

[a] ∵ ABCD is a rectangle

∴ $\overleftrightarrow{AB} // \overleftrightarrow{CD}$

, ∵ M ∈ $\overleftrightarrow{AB}$, N ∈ $\overleftrightarrow{AB}$

∴ $\overline{MN} // \overline{DC}$

, ∵ $\overline{CN} // \overline{DM}$

∴ MNCD is a parallelogram

, ∵ the rectangle ABCD and the parallelogram MNCD have the common base $\overline{CD}$

, ∵ $\overleftrightarrow{AB} // \overline{CD}$

∴ The area of ▱ MNCD = the area of □ ABCD $= 18 \times 5 = 90$ cm^2. (First req.)

∴ The length of the perpendicular from M to $\overline{CN}$ $= \frac{\text{The area of ▱ MNCD}}{CN} = \frac{90}{20} = 4.5$ cm. (Second req.)

[b] ∵ ΔΔ ABD , ACD have a common base $\overline{AD}$

, $\overline{AD} // \overline{BC}$

∴ The area of Δ ABD = the area of Δ ACD

Subtracting the area of Δ AMD from both sides

∴ The area of Δ AMB = the area of Δ DMC

(Q.E.D.)

5

[a] ∵ $\overline{MN}$ is a median in Δ BCM

∴ The area of Δ BMN = the area of Δ CMN (1)

, ∵ the area of the figure ABNM = the area of the figure DCNM (2)

Subtracting (1) from (2) :

∴ The area of Δ ABM = the area of Δ DCM

and the lengths of their bases are equal and on the same straight line and the two triangles are on the same side of the straight line.

∴ $\overline{CB} \parallel \overline{DA}$ (Q.E.D.)

[b] In ΔΔ ABC , AOL :

∵ $\overline{BC} \parallel \overline{OL}$, $\overleftrightarrow{AB}$ is a transversal

∴ m (∠ B) = m (∠ AOL) (corresponding angles) (1)

, ∵ $\overline{BC} \parallel \overline{OL}$, $\overrightarrow{AC}$ is a transversal

∴ m (∠ C) = m (∠ ALO) (corresponding angles) (2)

, ∠ A is a common angle (3)

From (1) , (2) and (3) :

∴ Δ ABC ~ Δ AOL (First req.)

, $\frac{AB}{AO} = \frac{BC}{OL} = \frac{AC}{AL}$ ∴ $\frac{6}{4} = \frac{7.5}{OL} = \frac{AC}{6}$

∴ $AC = \frac{6 \times 6}{4} = 9$ cm.

∴ CL = 9 – 6 = 3 cm.

, $OL = \frac{4 \times 7.5}{6} = 5$ cm. (Second req.)

15 Aswan

1 [1] (b) [2] (d) [3] (a) [4] (c) [5] (b)

2 [1] B [2] BC [3] 120° [4] 10 [5] 154

3

[a] ∵ ABCD is a parallelogram

∴ $\overline{AB} \parallel \overline{CD}$ ∴ $\overleftrightarrow{BE} \parallel \overline{CD}$ (1)

, ∵ the area of Δ AME = the area of Δ ABC

Subtracting the area of Δ AMB from both sides

∴ The area of Δ MBE = the area of Δ MBC

and they have a common base $\overline{MB}$ and on one side of it

∴ $\overline{CE} \parallel \overleftrightarrow{BD}$ (2)

From (1) and (2) :

∴ The figure BECD is a parallelogram. (Q.E.D.)

[b] ∵ Δ ADC is right-angled at D

∴ $(AC)^2 = (AD)^2 + (DC)^2 = (4)^2 + (8)^2 = 80$

, ∵ Δ ADB is right-angled at D

∴ $(AB)^2 = (AD)^2 + (BD)^2 = (4)^2 + (2)^2 = 20$

In Δ ABC :

∵ $(AC)^2 + (AB)^2 = 8 + 20 = 100$

, $(BC)^2 = (10)^2 = 100$

∴ $(BC)^2 = (AC)^2 + (AB)^2$

∴ m (∠ BAC) = 90° (Q.E.D.)

4

[a] ∵ Δ ABF has a common base $\overline{AB}$ with ▱ ABCD , $F \in \overline{DC}$

∴ The area of Δ ABF = $\frac{1}{2}$ the area of ▱ ABCD

∴ The area of Δ ADF + the area of Δ FBC = $\frac{1}{2}$ the area of ▱ ABCD (1)

∵ Δ EBC has a common base $\overline{BC}$ with ▱ ABCD , $E \in \overleftrightarrow{AD}$

∴ The area of Δ EBC = $\frac{1}{2}$ the area of ▱ ABCD (2)

From (1) and (2)

∴ The area of Δ ADF + the area of Δ FBC = the area of Δ EBC

Subtracting the area of Δ FBC from both sides

∴ The area of Δ AFD = the area of Δ EFC

(Q.E.D.)

[b] In Δ XYZ :

∵ $(YZ)^2 = (11)^2 = 121$

, $(XY)^2 + (XZ)^2 = (8)^2 + (6)^2 = 100$

∴ $(YZ)^2 > (XY)^2 + (XZ)^2$

∴ Δ XYZ is an obtuse-angled triangle. (The req.)

5

[a] In $\Delta\Delta$ ABC , EBD :

$\because \overline{AC} // \overline{DE}$, $\overleftrightarrow{AE}$ is a transversal

$\therefore$ m ($\angle$ A) = m ($\angle$ E) (alternate angles) (1)

, $\because \overline{AC} // \overline{DE}$, $\overleftrightarrow{CD}$ is a transversal

$\therefore$ m ($\angle$ C) = m ($\angle$ D) (alternate angles) (2)

, $\because$ m ($\angle$ ABC) = m ($\angle$ DBE) (V.O.A.) (3)

From (1) , (2) and (3) :

$\therefore \Delta$ ABC ~ Δ EBD (First req.)

, $\frac{AB}{BE} = \frac{BC}{BD} = \frac{AC}{DE}$ $\therefore \frac{3}{BE} = \frac{4}{8}$

$\therefore BE = \frac{8 \times 3}{4} = 6$ cm. (Second req.)

[b] $\because \Delta\Delta$ ABD , ABC have a common base $\overline{AB}$, $\overline{AB} // \overline{CD}$

$\therefore$ The area of Δ ABD = the area of Δ ABC

Subtracting the area of Δ ABM from both sides.

$\therefore$ The area of Δ AMD = the area of Δ BMC

But the area of Δ AMD = the area of Δ MCE

$\therefore$ The area of Δ BMC = the area of Δ MCE

and they have a common base $\overline{CM}$ and on one side of it

$\therefore \overline{MC} // \overline{BE}$ (Q.E.D.)

كيفية طباعة صفحات معينة من ملف معين

مثلا ازاى نطبع الصفحات من صفحة 4 الى صفحة 9